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## OF THE
# AMERICAN WATER WORKS ASSOCIATION

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*In this Issue*

Radio Channels for the Water Supply Industry

Interconnections *Nussbaumer, Critchlow*

Electrical Power Pumping *Richardson*

Supply Line Construction *Patterson*

Chlorination
*Adams, Alexander, Griffin, Gilcreas, Hallinan*

Bacteriology *Shannon, Wallace, Hirsch*

Postwar Public Works *Bleck*

Bi-Monthly Meter Reading

Renegotiation of Water Bills U-1 Revisions

Index for 1944 Journal

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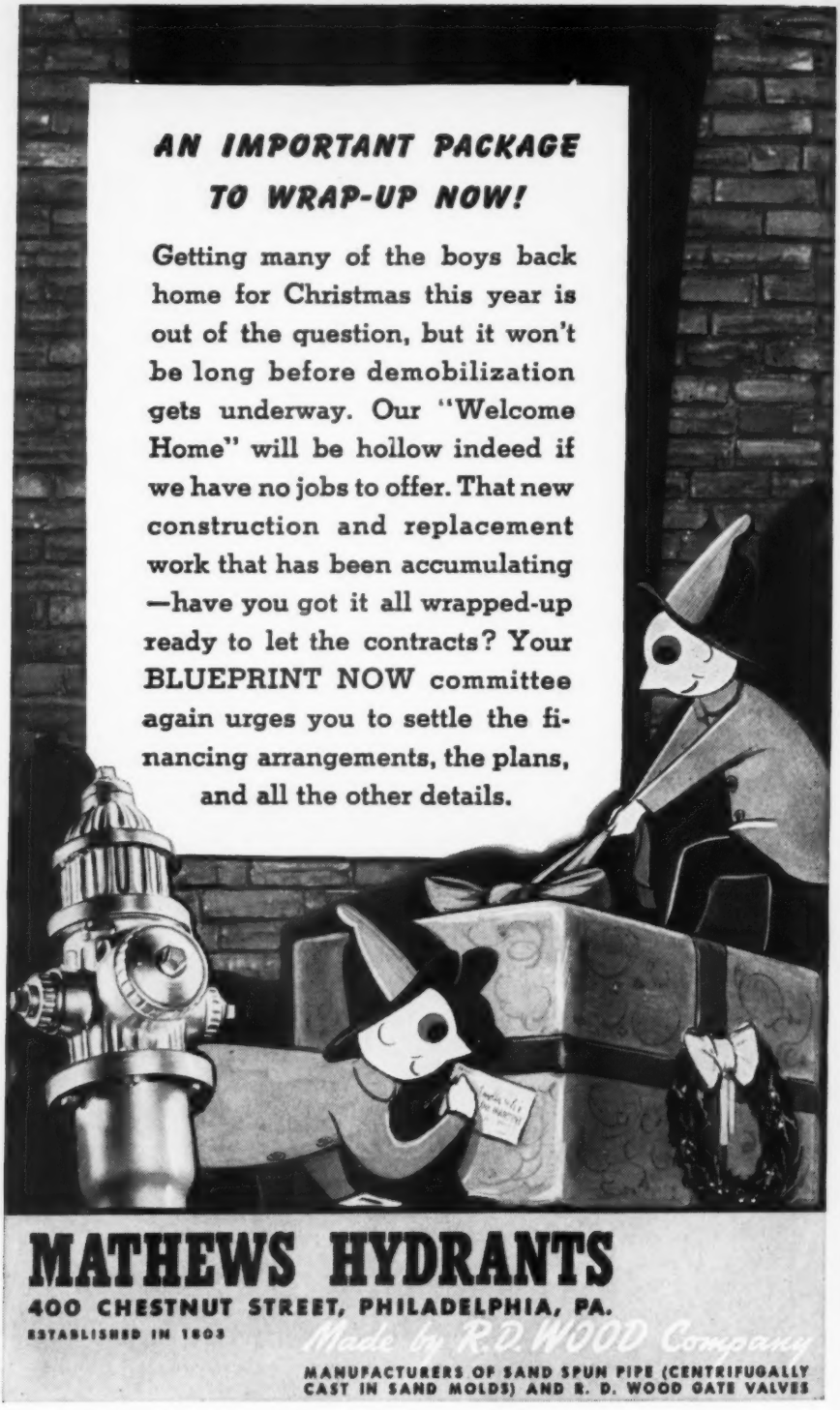
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# AMERICAN WATER WORKS ASSOCIATION

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1. Cox — Jl. A.W.W.A., 31:1489. (1939)
2. Faber — Jl. A.W.W.A., 31:1599. (1939)
3. Weber, Bender, Levine — Jl. A.W.W.A., 32:1904. (1940)
4. Griffin, Chamberlain — A.P.H.A. Paper (Oct. 1944)

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Vol. 36 December 1944 No. 12

# Application of the Public Water Supply Industry for Radio Channel Allocations

## Introductory Statement

In September 1943, a "Radio Technical Planning Board" was organized by several associations within the Radio Industry "to formulate sound engineering principles and to organize technical facts which will assist in the development, in accordance with the public interest, of the radio industry and radio services of the nation, and to advise government, industry and the people of its determination." Membership on the Board was opened to "those non-profit associations and societies which have an important interest in radio and which indicate a willingness to co-operate in achieving the objectives of the R.T.P.B."

The work is being carried out by thirteen panels and numerous panel committees and subcommittees. In general, the major activity centers upon (1) the determination and coordination of the channel (allocated frequency) requirements of the various services, (2) the specification of technical standards for methods and equipment, and (3) the formulation of preferred operating rules and regulations.

On June 23, 1944, William Victor Weir of the St. Louis County Water Co. was appointed to Committee 4 to represent the A.W.W.A. After a preliminary review of the situation through personal contact and correspondence, Weir addressed a formal inquiry (Sept. 1, 1944) re use of radio to the managers of all water departments and companies serving cities of more than 50,000 population. The data received are summarized as Appendix A of the statement which follows.

A formal request for allocation of radio channels for water works use was filed with the FCC on Sept. 18, 1944.

Beginning on Sept. 28, 1944, formal hearings on the subject were held by the Federal Communications Commission. The week of October 16 was set aside for presentation of Panel 13 statements.

The findings of the Commission, when made, will be fully outlined in this JOURNAL.

HARRY E. JORDAN
*Secretary*

## General Testimony

In any individual community, water supply comes closest to being the fundamental public utility service. Without a safe and potable supply of water, delivered at suitable pressure and in adequate amounts to meet all emergency as well as all normal demands, practically all residential, business, industrial, social, nutritional and recreational activity would cease or be seriously handicapped.

When the water supply fails, fire protection services are helpless, power plants shut down, hospitals cannot function effectively and all sanitary facilities become inoperative. In addition, serious life, health and property hazards may develop due to comparatively minor operating difficulties whose outward effects would hardly be noticed by the water consumers. For example, reductions in operating pressure as the result of pipe breakages or the operation of the valves to minimize the effects of such breaks or to repair them, may constitute a serious health hazard because of the possibility of contamination being drawn into the water supply system through plumbing fixtures when the reduced main pressure causes a vacuum to be set up on portions of house piping systems. Illnesses of epidemic proportions can and have developed from comparatively minor operating difficulties which resulted in accidental contamination of a public water supply. The public generally does not realize the extent of its dependence upon the water supply system until the water ceases to flow from the taps. Then the reaction is quick and of almost panic proportions. Detailed information regarding the trouble and its correction must be transmitted accurately and quickly between the control centers and field forces if serious complications are to be avoided.

The public water supply industry in this country includes more than 12,800 separate water departments and water companies of which 75 per cent are municipally owned and operated. These water works systems serve over 85,000,000 people, and range in size from the smaller villages, which have only a few miles of pipe in service, to cities like Los Angeles and New York, which have transmission aqueducts from 30 to 350 mi. in length, and distribution networks like that of the city of New York which include two 15-ft. diameter deep rock tunnels each about 20 mi. in length, 5,028 mi. of street mains, 142,000 main valves and 670,000 service connections to buildings.

In the operation and maintenance of any water works system, emergencies of various sorts develop more or less regularly and prompt and effective action must be taken to find the trouble, to localize it, to correct it, to take proper counter measures to protect the rest of the system and in general to maintain the sanitary as well as the physical integrity of the system as a whole. This requires speedy, accurate and effective communication service, not only between control centers, pumping stations, gate houses, reservoirs,

---

General testimony presented on Oct. 21, 1944, before a hearing of the Federal Communications Com. by Charles F. Meyerherm, Cons. Elec. Engr., New York, N.Y., and member of the Public Water Supply Group, Committee 4, Panel 13, Radio Technical Planning Board. The statement was prepared in preliminary outline by William Victor Weir, Supt., St. Louis County Water Co., University City, Mo., and modified in various conferences with persons interested in the use of radio by water works systems.

filtration plants, etc., but essentially with the field crews, engineers, supervisors, scouts, etc., who cannot be reached effectively by wire communication facilities. That is the reason the water supply industry feels that it must have radio communication facilities and requests permission to use this form of communication service.

In the past, water works systems have used, and in the future they will unquestionably continue to make the fullest possible use of, existing wire communication facilities. However, the failure or complete overloading of wire communication facilities during conflagrations, hurricanes, floods, severe local wind, rain or sleet storms, electric power outages, etc., at times when water utilities were in greatest need of effective communication service have immeasurably increased life, health and property hazards to the public. Twice within the last six years, the Metropolitan New York and the upper Atlantic Coast areas have suffered a widespread breakdown of telephone and electric facilities as the result of tropical hurricanes and the operation and maintenance of water supply systems have been most seriously impaired by the lack of communication facilities. Similarly, on the West Coast, and to a lesser extent elsewhere in the U.S., earthquakes have disrupted utility systems, and they will do so again, possibly to an even greater extent. Radio communication facilities are therefore a vital necessity for water works systems as well as all public utility services.

The water supply industry has realized the weaknesses inherent in wire communication facilities during emergencies and the inability of these facilities to reach field forces. It has also appreciated the fact that radio communication facilities could be used effectively to overcome these deficiencies.

A survey of the existing and probable future use of radio communication in the water works field has just been completed and a compilation of the results is attached to this statement as Appendix A. This procedure was made necessary because of the fact that in the comparatively short time available to the water works group before the Panel 13 meeting, it was impossible to collect the necessary information and have it ready for that meeting.

In scope and character, the water works radio facilities survey closely paralleled the one carried out by the electric and gas utilities; the results of which are given in Exhibit 4.3 of Report No. 4. The results of the water works survey of existing and estimated future radio facilities are summarized as follows:

### Present Radio Facilities

Data regarding present radio facilities received from water utilities serving 60 of the 197 cities having populations of 50,000 or larger indicated:

(1) Approximately 51 per cent ($\frac{31}{60}$) of these utilities are now using radio.

(2) Approximately 43 per cent ($\frac{26}{60}$) of these utilities are utilizing police fixed transmitters as the primary transmitting station.

(3) Approximately 25 per cent ($\frac{15}{60}$) of these utilities are operating mobile transmitter units.

(4) Approximately 27 per cent ($\frac{16}{60}$) of these utilities are operating mobile receivers only.

(5) None of the utilities serving the four largest cities in the United States is now using radio, although one is undertaking some experimental testing. (Due to heavy use of police radio transmitters in these congested areas,

the police radio service is probably not available to the water utility.)

(6) In the 50,000 to 100,000 population group 30 per cent ($\frac{6}{20}$) are utilizing police radio service. In the next smaller population group, say 30,000 to 50,000, police radio service is also probably available and is undoubtedly being utilized extensively.

(7) Extrapolating from the data on hand it is estimated that between 90 and 100 utilities serving cities larger than 50,000 population are operating 20 or more fixed transmitters, 200 or more mobile transmitters and approximately 350 mobile receivers only. The entire water supply industry, including utilities serving cities of less than 50,000, is probably utilizing at least 300 mobile receiver-transmitters and 500 mobile receivers only.

### Estimated Future Facilities

Based on the data received in the returned questionnaires, the estimated probable total number of transmitters, five years after the war, is 947 on the basis of present regulations and 1824 on the basis of relaxed regulations, for water utilities serving communities of 50,000 population and larger. Adding 25 per cent to these requirements to cover radio facilities which might be installed by utilities serving communities below 50,000 population, a number of which are actually large utilities serving several smaller cities by means of a large unified system, the probable total future use of radio will approximate 1,100 to 1,200 transmitters on the basis of present regulations and 2,200 to 2,300 transmitters on the basis of relaxed regulations. These estimates do not include fixed transmitters operated jointly by police and water departments, but include only the fixed, portable and mobile transmitters to be operated by water utilities.

Mobile radio receivers only, in addition to mobile transmitter-receiver units, are estimated (adding 25 per cent to the figures for utilities serving cities of over 50,000 population) to approximate 700 on the basis of present regulations and 1,500 on the basis of relaxed regulations.

### Channel Requirements

Based on a careful study of the public water supply industry's present and postwar radio needs in rural, metropolitan and non-metropolitan areas, it would appear that a total of at least 19 channels in the following frequency ranges are necessary:

| MC. Region | Channels |
|---|---|
| 2– 6 | 2 |
| 30– 40 | 6 |
| 40–300 | 11 |

The public water supply industry, therefore, requests the Federal Communications Commission to give the foregoing channel requirements its studied consideration in the light of the essentiality of water service to the general public, and the benefit which the public will obtain through the water works industry's use of radio communication facilities.

## Appendix A

### *Public Water Supply Utilities*

### *Present and Estimated Future Use of Radio Communications*

The following information has been obtained from questionnaire forms sent to water supply utilities serving cities of 50,000 or more population.

Of 198 cities in this population group, returns were received from water utilities serving 61 cities. In considering the data, the requirements of the utility serving one city of over one million population were disregarded, since these requirements are being transmitted by the electric power utility group. The city operates a combined water and electric power department. It is therefore considered that 60 returns have been received from utilities serving 197 of the larger cities. This is a fair sample. Extrapolation of these data to obtain estimates of present and future radio facility data for the entire water supply industry is a warranted and reasonable method of estimating the necessary totals.

In asking for questionnaire information regarding future use of radio, the water utilities were requested to supply estimates based on (1) a continuance of present regulations restricting the use of radio communications to presently outlined emergency situations, and (2) a relaxed or more liberal set of regulations which would enable essential operating communications to be handled by radio.

A summary of the information derived from the survey by Mr. Weir appears under the heading "General Testimony." A tabulation of the questionnaires is shown in Tables 1, 2 and 3.

TABLE 1

*Comparisons Based on Reported Data*

Data, percentages and factors deduced from information on returned questionnaires, comparing utilities using and planning to use radio with those not planning to use radio.

| (1) Population Group | (2) Number Cities in Group | (3) Number Answering Questionnaire | (4) Number Now Using Radio | (5) Number Planning Future Use of Radio | (6) Number Not Planning Use of Radio | (7) Per Cent Now Using Radio— (4)/(3) | (8) Per Cent Planning to Use Radio— (5)/(3) | (9) Factor to Apply to Estimated Facilities— (2)/(3) |
|---|---|---|---|---|---|---|---|---|
| Over 1,000,000* | 4 | 4 | 0 | 3 | 1 | 0 | 80 | 1.00 |
| 500,000 to 1,000,000 | 9 | 5 | 4 | 4 | 1 | 80 | 80 | 1.80 |
| 400,000 to 500,000 | 4 | 2 | 1 | 2 | 0 | 50 | 100 | 2.00 |
| 300,000 | 12 | 7 | 5 | 6 | 1 | 71 | 86 | 1.71 |
| 200,000 | 13 | 6 | 4 | 5 | 1 | 67 | 83 | 2.17 |
| 100,000 | 49 | 16 | 9 | 13 | 3 | 56 | 81 | 3.06 |
| 50,000 | 106 | 20 | 8 | 12 | 8 | 40 | 60 | 5.30 |
| Totals* | 197 | 60 | 31 | 45 | 15 | 25 | 75 | 3.04 |

* Utility No. 4 Omitted (see footnote, Table 2).

TABLE 2

*Detailed Water Utility Radio Facilities (Data from Reporting Utilities)*

| Water Utility | Existing Facilities: Transmitters: Fixed: No. | Fixed: Freq. | Fixed: Emis. | Port. and Mobile: No. | Port. and Mobile: Freq. | Port. and Mobile: Emis. | Recvrs. Only No. | Probable Total Facilities 5 Years After War: Transmitters: Fixed—Number: Pres. | Fixed: Relx. | Fixed: Freq. | Fixed: Emis. | Port. and Mobile—Number: Pres. | Port. and Mobile: Relx. | Port. and Mobile: Freq. | Port. and Mobile: Emis. | Recvrs. Only: Pres. | Recvrs. Only: Relx. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | — | — | — | — | — | — | — | 39 | 55 | 2–2.5<br>30–40<br>40–300 | A1, A2<br>A3 Sp<br>A3 Sp | 92 | 97 | 30–40<br>40–300 | A3 Sp<br>A3 Sp | — | — |
| 2 | — | — | — | — | — | — | — | — | 1 | ? | A3 Sp | — | 7 | ? | A3 Sp | — | 64 |
| 3 | — | — | — | — | — | — | — | 1 | 1 | 39–40 | A3 Sp | 15 | 30 | 39–40 | A3 Sp | 27 | 40 |
| 4* | | | | | | | | | | | | | | | | | |
| 5 | P | 2.458 | A3 | — | — | — | 9 | 1 | 1 | 30–40 | A3 | — | — | — | — | 35 | 35 |
| 6 | P | 2.466 | A3 | — | — | — | 10 | P | P | 2.466 | A3 | — | — | — | — | 10 | 10 |
| | | | | | | | | 2 | 4 | 100–300 | A3 | 6 | 12 | 100–300 | A3 | — | — |
| 7 | P | 1.706 | A3 | — | — | — | 5 | P | P | 1.706 | A3 | — | — | — | — | 8 | 10 |
| 8 | 4 | 37.5 | A3 | 9 | 37.5 | A3 | — | 4 | 4 | 37.5 | A3 | 16 | 16 | 37.5 | A3 | — | — |
| 9 | — | — | — | — | — | — | — | — | 2 | ? | ? | — | — | — | — | — | 12 |
| 10 | P | 30.7 | A3 | — | — | — | 9 | P | P | 30.7 | A3 | — | — | — | — | 9 | 15 |
| 11 | P | 1.714 | A3 | — | — | — | 3 | P | P | 1.714 | A3 | — | — | — | — | 3 | 10 |
| 12 | 2 | 39.66 | A3 Sp | 6 | 39.66 | A3 Sp | 6 | 6 | 10 | 39.66 | A3 Sp | 24 | 20 | 39.66 | A3 Sp | 14 | 20 |
| 13 | P | ? | A3 | — | — | — | 3 | 8 | 8 | 2.2–2.7 | A1, A3 | 7 | 7 | 30–40 | A3 Sp | 5 | 3 |
| | | | | | | | | 2 | 2 | 100–150 | AM/FM | 3 | 3 | 100–150 | A3 Sp | | |
| 14 | P | 2.442 | A3 | — | — | — | 14 | P | P | 2.442 | A3 | — | — | — | — | 14 | 17 |
| 15 | — | — | — | — | — | — | — | — | 1 | ? | A3 Sp | — | 10 | ? | A3 Sp | — | — |
| 16 | P | 37.78 | A3 | 1 | 37.78 | A3 | 5 | 4 | 6 | 30–40 | A3 | 10 | 20 | 30–40 | A3 | 10 | 20 |
| 17 | P | 33.94 | A3 | — | — | — | 4 | P | P | 33.94 | A3 | — | — | — | — | 10 | 10 |
| 18 | — | — | — | — | — | — | — | — | 1 | 30–40 | A3 Sp | — | 13 | 30–40 | A3 Sp | — | — |
| 19 | P | 2.382<br>30.98 | A3<br>A3 | —<br>5 | —<br>30.98 | —<br>A3 | 7<br>— | P | P | 2.382<br>37.78 | A3<br>A3 Sp | —<br>6 | —<br>6 | —<br>30–40 | —<br>A3 Sp | 7<br>— | 7<br>— |

* Facilities, existing and future, have been reported under requirements of electric utilities.

TABLE 2 (*Continued*)

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | P | 2.45 | A3 | 3 | 33.22 | A3 | 7 | 1 | 1 | 30–40 | A3 | 30 | 30 | 30–40 | A3 | — | — |

* Facilities, existing and future, have been reported under requirements of electric utilities.

TABLE 2 (*Continued*)

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | P | 2.45 | A3 | 3 | 33.22 | A3 | 7 | 1 | 1 | 30–40 | A3 | 30 | 30 | 30–40 | A3 | — | — |
| 21 | P | 2.49 | A3 | — | — | — | 3 | 6 | 6 | 30–40 | A3 Sp | 14 | 16 | 30–40 | A3 Sp | 20 | 20 |
| 22 | P | ? | ? | — | — | — | 1 | P | P | ? | ? | — | — | — | — | 8 | 8 |
| 23 | P | 2.45 | A3 | — | — | — | 6 | P | — | 2.45 | A3 | — | — | — | — | 6 | — |
| | | | | | | | | | 1 | 30–40 | A3 | — | 10 | 30–40 | A3 | — | 35 |
| 24 | P | 33.1 | A3 | — | — | — | 6 | P | P | 33.1 | A3 | — | — | — | — | 6 | 6 |
| 25 | — | — | — | — | — | — | — | — | 1 | 30–40 | A3 Sp | — | 7 | 30–40 | A3 Sp | — | — |
| 26 | P | ? | ? | — | — | — | 5 | 2 | 3 | ? | A3 | 6 | 6 | ? | A3 | 5 | 5 |
| 27 | — | — | — | — | — | — | — | 1 | 3 | ? | A3 | 8 | 8 | ? | A3 | 8 | 8 |
| 28 | P | 2.466 | A3 | 10 | 31.78 | A3 | — | P | P | 116.0 | A3 | 10 | 10 | 116.0 | A3 | — | — |
| 29 | — | — | — | — | — | — | — | 1 | 1 | ? | A3 | 7 | 7 | ? | A3 | — | — |
| 30 | 1 | 33.5 | A3 | 3 | 39.38 | A3 | — | 1 | 1 | 33.5 | A3 | 11 | 11 | 39.38 | A3 | — | — |
| 31 | — | — | — | — | — | — | — | 2 | 2 | 30–40 | A3 Sp | 6 | 8 | 30–40 | A3 Sp | 6 | 8 |
| 32 | P | 33.1 | A3 | 7 | 35.1 | A3 | 9 | P | P | 33.1 | A3 Sp | 12 | 12 | 35.1 | A3 Sp | 14 | 14 |
| 33 | P | 2.474 | A3 | — | — | — | 13 | P | — | 2.474 | A3 | — | — | — | — | 18 | — |
| | | | | | | | | | 12 | ? | A1, 2, 3 | — | 32 | ? | A3 | | 50 |
| 34 | P | 35.9 | A3 Sp | 10 | 35.9 | A3 Sp | — | 1 | 6 | 35.9 | A3 Sp | 10 | 22 | 35.9 | A3 Sp | — | — |
| | | 2.414 | A3 | — | — | — | 12 | 1 | — | 2.414 | A3 | — | — | — | — | 12 | 20 |
| 35 | 2 | 39.86 | A3 Sp | — | — | — | — | 2 | 2 | 39.86 | A3 Sp | — | 5 | 39.86 | A3 Sp | — | 5 |
| 36 | P | ? | A3 | 3 | ? | A3 | 5 | P | 1 | 30–40 | A3 Sp | 3 | 24 | 30–40 | A3 Sp | 5 | 36 |
| 37 | P | 33.94 | A3 | 3 | 33.22 | A3 | — | 2 | 2 | 33.94 | A3 | 4 | 10 | 33.22 | A3 | — | — |
| 38 | P | ? | ? | 2 | ? | ? | — | P | P | ? | ? | 2 | 6 | ? | ? | — | — |
| 39 | — | — | — | — | — | — | — | — | 1 | 30–40 | A3 Sp | — | 6 | 30–40 | A3 Sp | — | — |
| 40 | — | — | — | — | — | — | — | — | 1 | 30–40 | A3 Sp | — | 20 | 30–40 | A3 Sp | — | — |
| 41 | — | — | — | — | — | — | — | — | 1 | ? | A3 Sp | — | 10 | ? | A3 Sp | — | 15 |
| 42 | P | 1.714 | A3 | 3 | 1.714 | A3 | — | 1 | 1 | 30.58 | A3 | 3 | 3 | 30.58 | A3 | — | — |
| 43 | — | — | — | — | — | — | — | — | 1 | ? | ? | — | 8 | ? | ? | — | — |
| 44 | 1 | 31.46 | A3 Sp | — | — | — | — | 4 | 5 | 31.46 | A3 Sp | 1 | 6 | 31.46 | A3 Sp | — | — |
| 45 | P | 2.442 | A3 | 2 | 33.22 | A3 | — | P | P | ? | A3 Sp | 5 | 5 | ? | A3 Sp | — | — |
| 46 | P | 37.9 | A3 Sp | 1 | 37.9 | A3 Sp | — | P | P | 37.9 | A3 Sp | 25 | 25 | 37.9 | A3 Sp | — | — |

Data furnished by water utilities which now use or have postwar plans for the use of radio communications. Forty-six utilities indicated plans for postwar use of radio, and data for these utilities are shown:

| *Utilities* | *Serving Cities—Population* |
|---|---|
| 1– 4 | 1,000,000 or greater |
| 5– 8 | 500,000–1,000,000 |
| 9–10 | 400,000– 500,000 |
| 11–16 | 300,000– 400,000 |
| 17–21 | 200,000– 300,000 |
| 22–34 | 100,000– 200,000 |
| 35–46 | 50,000– 100,000 |

Fifteen utilities indicated no present or postwar use of radio communications.

The letter "P" indicates that the local police transmitter is being or will be used.

Data under heading "Pres." are data applicable if present restrictive regulations continue in force. Data under heading "Relx." are data applicable if relaxed (more liberal) regulations are made applicable to the use of radio by water supply utilities.

TABLE 3

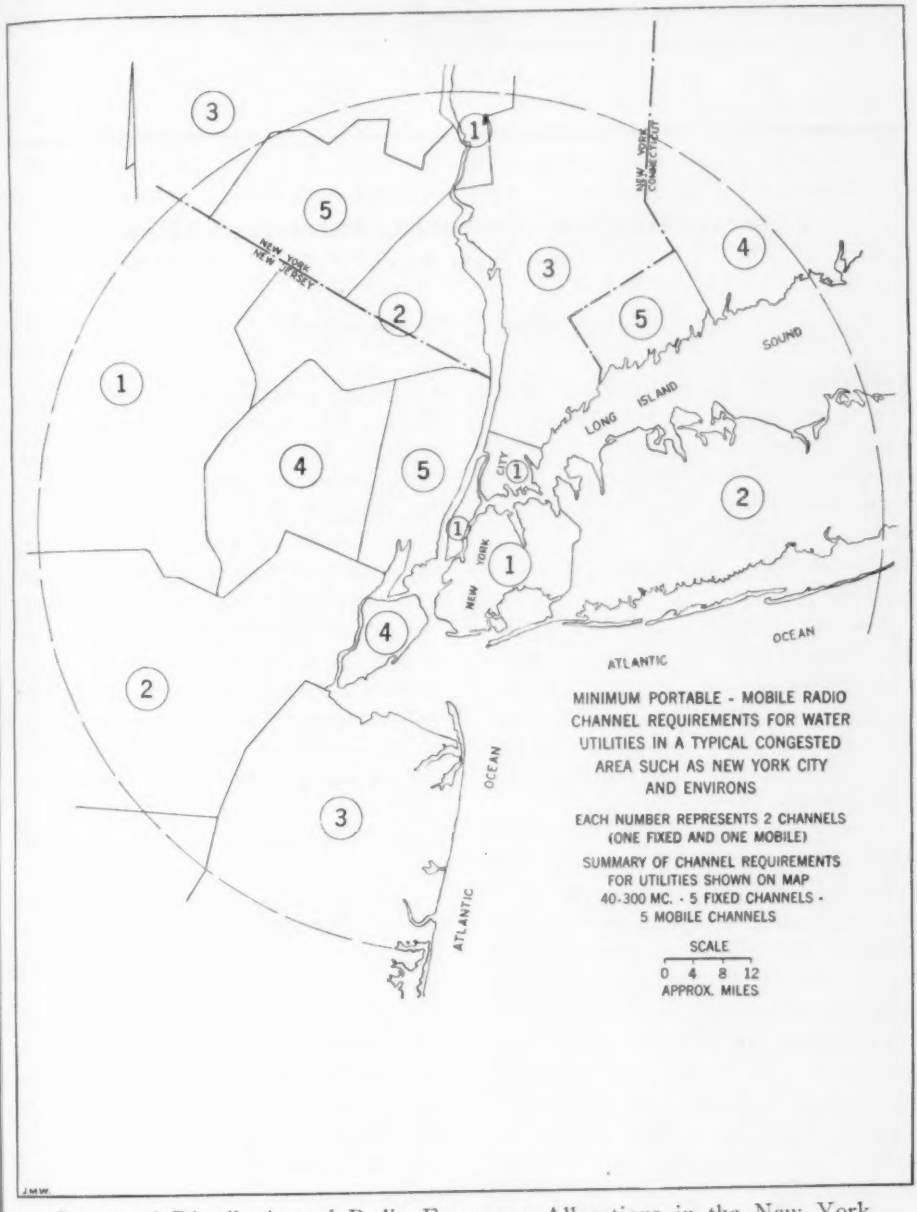
*Radio Facilities, Reported and Estimated*

Reported and estimated data. Estimated total data obtained by extrapolation from reported data, applying factor (9) in Table 2.

*Radio Facilities—Data for Water Utilities Reporting (Cities of Over 50,000)*

| Population Group | Present Facilities | | | | | Probable Future Facilities | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number Using Radio | Fixed Transmitters | | Port. and Mobile Transmitters | Rcvrs. Only | Number to Use Radio | Fixed Trans. (Utility) | | Port. and Mobile Transmitters | | Receivers Only | |
| | | Utility | Police | | | | Pres. | Relx. | Pres. | Relx. | Pres. | Relx. |
| Over 1,000,000* | 0 | 0 | 0 | 0 | 0 | 3 | 40 | 57 | 107 | 134 | 27 | 104 |
| 500,000–1,000,000 | 4 | 4 | 3 | 9 | 24 | 4 | 7 | 9 | 22 | 28 | 53 | 53 |
| 400,000–500,000 | 1 | 0 | 1 | 0 | 9 | 2 | 0 | 2 | 0 | 0 | 9 | 27 |
| 300,000–400,000 | 5 | 2 | 4 | 6 | 31 | 6 | 20 | 27 | 44 | 60 | 46 | 70 |
| 200,000–300,000 | 4 | 0 | 4 | 8 | 21 | 5 | 7 | 8 | 50 | 65 | 37 | 37 |
| 100,000–200,000 | 9 | 1 | 8 | 30 | 52 | 13 | 9 | 30 | 70 | 133 | 83 | 154 |
| 50,000–100,000 | 8 | 2 | 6 | 14 | 5 | 12 | 9 | 15 | 43 | 128 | 5 | 56 |
| Total * | 31 | 9 | 26 | 67 | 142 | 45 | 92 | 148 | 336 | 548 | 260 | 501 |
| *Total Radio Facilities—Estimated for Water Utilities Serving Cities of Over 50,000* | | | | | | | | | | | | |
| Over 1,000,000* | 0 | 0 | 0 | 0 | 0 | 3 | 40 | 57 | 107 | 134 | 27 | 104 |
| 500,000–1,000,000 | 7 | 7 | 5 | 16 | 43 | 7 | 12 | 16 | 39 | 50 | 95 | 95 |
| 400,000–500,000 | 2 | 0 | 2 | 0 | 18 | 4 | 0 | 4 | 0 | 0 | 18 | 54 |
| 300,000–400,000 | 8 | 3 | 7 | 10 | 53 | 10 | 34 | 46 | 75 | 102 | 79 | 119 |
| 200,000–300,000 | 9 | 0 | 9 | 17 | 46 | 11 | 15 | 17 | 108 | 141 | 80 | 80 |
| 100,000–200,000 | 28 | 3 | 25 | 92 | 159 | 40 | 27 | 92 | 214 | 407 | 254 | 471 |
| 50,000–100,000 | 42 | 10 | 32 | 74 | 27 | 64 | 48 | 79 | 228 | 679 | 27 | 296 |
| Total * | 96 | 23 | 80 | 209 | 346 | 139 | 176 | 311 | 771 | 1,513 | 580 | 1,219 |

* Utility No. 4 Omitted (see footnote, Table 1).




Suggested Distribution of Radio Frequency Allocations in the New York Metropolitan Area

In the United States, there are a number of metropolitan areas such as Boston, New York, Philadelphia, Baltimore, Washington, Chicago, St. Louis, San Francisco-East Bay, Los Angeles, etc., where a number of separate water utilities or departments serve the population within the region. The above map indicates schematically suggested assignments within a region covering in some cases single water departments, in some cases small groups of departments and in some all within a county.

* Utility No. 4 Omitted (see footnote, Table 1).

# Constructing and Financing Interconnections in New York

*By Newell L. Nussbaumer*

PRIOR to the present war period the construction of interconnections in water supplies had generally been avoided rather than encouraged in the Niagara frontier, a highly industrialized area adjacent to the Niagara River, having a population of about 1,000,000 persons.

The two largest population centers are Niagara Falls in Niagara County and Buffalo in Erie County. The two counties are separated by the New York State Barge Canal and the distance between the two cities by highway is about 20 mi.

During the period following 1933 when PWA and WPA funds were available, the New York State Dept. of Health made a determined effort to improve the quality of water in the Niagara River by eliminating as much pollution as possible. As a result of this program, Buffalo, the city of Tonawanda, in Erie County, and Niagara Falls installed sewage treatment plants. Niagara Falls also improved and enlarged its water supply and extended its distribution system to serve as a source of supply for the nearby villages of Lewiston and Youngstown, as well as for several suburban water districts. This permitted the abandonment of two small filter plants previously supplying these areas and made the Niagara Falls water supply the single source of supply for the city and most of the adjacent suburban area. As North Tonawanda, the nearest community having a water supply of its own, is several miles away, a connection between the two would be rather expensive and was not seriously pressed because Niagara Falls operates two separated water plants and intakes and has access to a reserve intake which could be used in an emergency.

Prior to 1941 the situation in and around Buffalo, however, was quite different. Here, with few exceptions, the city of Buffalo water supply served only the 42 sq.mi. within the city limits. The Western New York Water Co., a private utility company, served the suburban area immediately adjacent to Buffalo, including many large industries and railroads. The intake and treatment works for this system are in Woodlawn, south of Buffalo, where water is taken from Lake Erie. The distribution system extends east and north around Buffalo to the town of Tonawanda, a distance of about 25 mi. Beyond the service area, the city of

A paper presented on June 15, 1944, at the Milwaukee Conference by Newell L. Nussbaumer, Comr. of Public Works, Buffalo, N.Y.

Tonawanda, with a population of about 15,000 persons, and the city of North Tonawanda, with a population of about 20,000 persons, each has its own water system.

In the past, efforts of the city of Buffalo to serve customers outside the city limits had been successfully opposed by the private water company, so the only service given outside the city limits was that to a few industries, and to the village of Kenmore on an emergency basis, each of whom secured metered service within the city, extending mains at their own expense beyond the city limits. The Western New York Water Co. also had one in an area where the normal service was inadequate.

A certain amount of rivalry had always existed between the cities of Tonawanda and North Tonawanda, located in different counties but separated only by the Barge Canal, which resulted in a lack of co-operation between the cities despite the fact that neither water system had elevated storage.

It is readily seen that this background would not of itself produce an interconnection of water systems.

With the advent of war, new large wartime industries and additions to present plants were built in the industrial areas both within and adjacent to Buffalo and the Tonawanda cities. The additional demand for water by these plants particularly taxed the capacity of the Western New York Water Co. and the plants in the two Tonawandas.

The rated capacity of the Western New York Water Co. plant is 16 mgd., with an average load of over 18 mgd. They have been able to handle this because of recent additions to the plant and reinforcements to the distribution system. The plant at Tonawanda has a capacity of 6 mgd. and North Tonawanda 8 mgd.

The city of Buffalo, with a rated plant capacity of 160 mgd., can run for short periods at rates in excess of 200 mgd. The average consumption of water in Buffalo during the early war period was about 130 mgd., with peak rates rarely exceeding 180 mgd. It was obvious, therefore, that any reinforcement of the smaller systems would have to come from Buffalo. It was equally obvious that any breakdown in any system would seriously interrupt the production of war supplies. After the Japanese air attack on Pearl Harbor and the mounting possibility of a mainland attack on the United States, the problem of fighting fires resulting from air attack immediately suggested the necessity of interconnecting the area water supplies to permit flow of water from any existing source to any point of distribution where the need might be greatest. The lead in this program was taken by the National Board of Fire Underwriters, and Earl Devendorf of the New York State Dept. of Health, who had been appointed Water Co-ordinator for the state. The consummation of the plan was directed by Alan Drake and Ralph Bates, Regional Co-ordinators.

The Plan of Interconnections proposed by the N.B.F.U. and Devendorf included the following:

1. Nine interconnections of an emergency nature between the city of Buffalo and the Western New York Water Co. systems. These connections were located, as shown on the general maps, around the Buffalo city line. Each consisted of two hydrants, one on each system, to be connected by portable hose installed between the steamer and the hose connections above ground.

As there is a higher pressure in the Western New York Water system, mobile pumping units capable of boosting water from the Buffalo system are provided, located in convenient stations to service the connections when required. There are six such units, each with a capacity of 500 gpm. The pumps are manufactured by the Ralph B. Carter Co. and are mounted on special frames equipped with adequate hose connections.

2. One connection at the Indian Church Road from the Buffalo system to the suction side of the Fremont Pump Station on the Western New York system. This is a solid underground connection consisting of about 3,340 ft. of 16-in. cast-iron pipe with meters installed in the line so that it may be placed in operation quickly. It is intended to be used as an auxiliary source of supply to the Western New York system, as well as an emergency connection for either system.

3. One connection from the Buffalo system to the village of Kenmore on the north. This is a solid underground connection consisting of about 1,600 ft. of 16-in. cast-iron pipe to a new pump station in Kenmore. This station can pump water from the Buffalo system into the 1-mil.gal. Kenmore elevated storage tank with a water plane about 35 ft. above the Buffalo system at the city line.

There are two pumping units in the station, each with a capacity of 2.5 mgd. The piping is arranged so that 5 mgd. can be delivered with the units operating in parallel, or a smaller amount at higher pressures with the pumps operating in series. Controls are arranged so that one pump is automatically placed in operation when the level in the storage tank drops to a determined low level. The pump is stopped when a high level point is reached. There is an emergency control which prohibits any pump from operating when the pressure in the Buffalo system drops to a determined low pressure.

The operating cost for personnel has been very low for this program, as one of the regular village employees has been able to take charge of the operation in addition to his regular duties. The 5 mgd. which can be pumped through this connection is enough to carry the entire village of Kenmore and part of the town of Tonawanda. The connection is to be used whenever there is a deficiency in pressure in Kenmore, as well as in emergencies. At the present time one pump is operating about one-half of the time.

4. Certain reinforcements in the town of Tonawanda distribution system fed by the Western New York Water Co. to secure better pressure in the northern and western sections of town. Although not a part of the original plan, a connection was made between the town of Tonawanda system and the village of Kenmore in lieu of originally proposed elevated storage. This connection, which is 12-in. cast-iron pipe, would permit surplus water from Kenmore secured from Buffalo to be extended to the town of Tonawanda, and so provide two primary sources of supply. As there are many war industries in the town of Tonawanda, this was very desirable.

As the program got under way and the need of interconnections for civilian protection was better realized, the following additions were proposed through the office of the state water co-ordinator:

5. Two connections between the town of Tonawanda and the city of Tonawanda on the south city line, each of 6-in. cast-iron pipe.

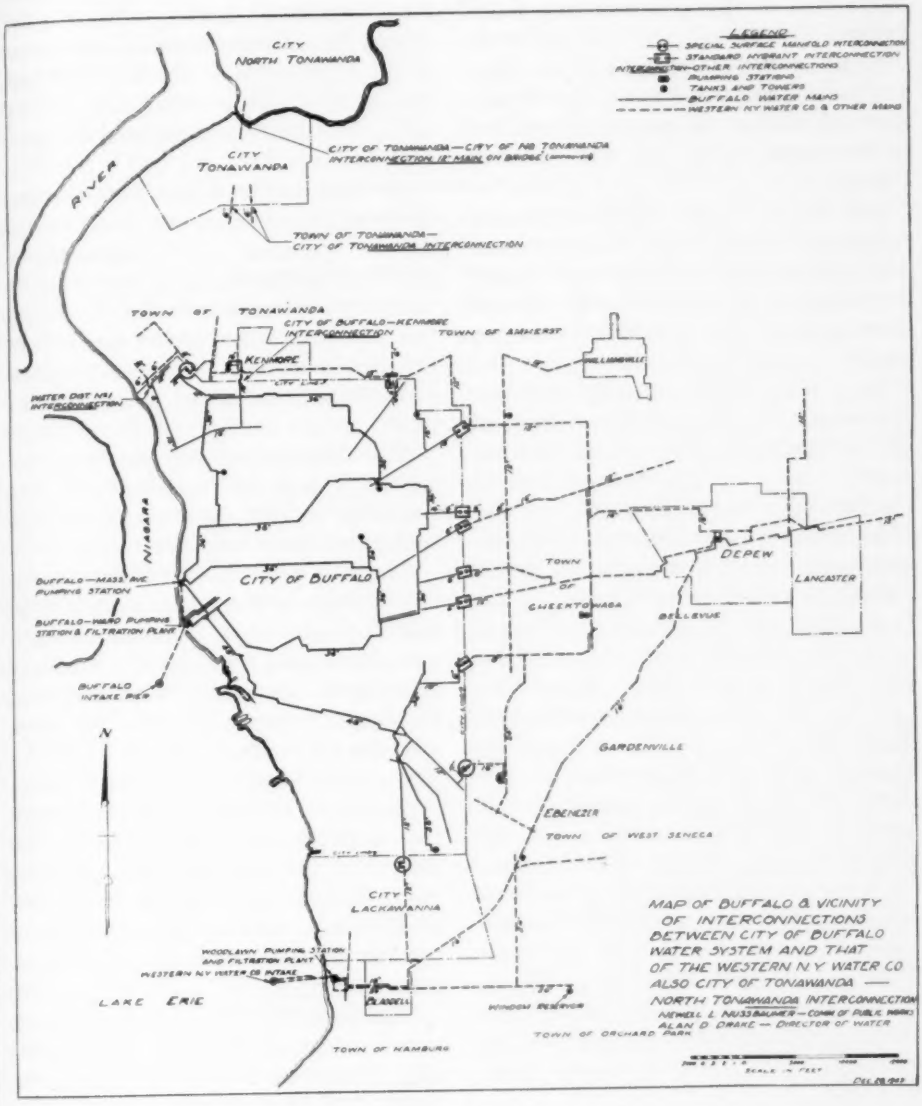



FIG. 1. General Map of District

6. A connection between the city of Tonawanda and North Tonawanda. This connection is 12-in. cast-iron pipe laid across the Barge Canal on a fixed bridge.

Both of these connections are particularly important from the standpoint of civilian protection, as neither of the above cities has any elevated storage.

All of the above connections were constructed under the authority and with the permission of the state water co-ordinator to whom such powers were granted by a special war act passed by the state legislature.

As a result of constructing these interconnections, pressures in the town of Tonawanda and the village of Kenmore, located on the extreme end of the Western New York Water Co. lines, improved considerably. The improvement was particularly noticeable during periods of heavy demand, as the new connections provided an additional volume of supply which reduced the fluctuations in pressures. A fire hazard was also removed as the village of Kenmore was now able to keep its storage tank practically full all the time. Under conditions previously existing it had been possible to fill the tank completely only on rare occasions. As Kenmore was largely supplied from the city of Buffalo, particularly in summer, water previously used by them from the Western New York Water Co. could be and was diverted to the town of Tonawanda with marked improvement in service from the town distribution system.

In 1943, as the industrial consumption increased at some of the war plants, requests were made for additional connections from the Buffalo system. The first was for a connection to an industry in the town of Cheektowaga. The second was to the town of Tonawanda, primarily to serve a new airplane engine plant. Both of these required hearings before the Water Power and Control Commission of the state of New York. The first was granted for standby fire service only. The latter was granted for general use.

As soon as the Tonawanda connection was placed in service, the Chevrolet Co. operating the airplane engine plant, no longer found it necessary to pump out of their service lines. When this pumping occurred, no one else in the neighborhood was able to draw water in their homes or places of business.

The interconnections involving the city of Buffalo are authorized as war measures for the duration of the war under the State War Act.

The city council, by resolution, authorized up to 7 mgd. of water to be sold through these connections, with not over 5 mgd. through the Kenmore connection, providing the pressures in the Buffalo system did not fall below a minimum required by the N.B.F.U. There have been times when heavy withdrawals have been made through the underground connections. The daily use on week days probably exceeds 3 mgd. most of the time. No incident has occurred as yet to require the use of the connections for emergency use only.

The financing of the above construction would have been an insurmountable obstacle if it had not been for the Federal Works Agency. The assistance given by Arthur Gorman of the War Production Board in securing priorities was particularly helpful.

The FWA financed the entire interconnection program between the Buffalo system and the suburban sys-

tems. This included all of the emergency connections, the underground Indian Church Road connection, the Mang Avenue pumping station in Kenmore and the mobile pumping units. The total cost was about $150,000.

The reinforcements in the town of Tonawanda cost about $350,000, of which the FWA paid one-half and the town paid one-half on the theory that they would receive that much permanent benefit.

The connections between the town and city of Tonawanda and the city of North Tonawanda were financed by the local communities.

The town of Tonawanda connection for the use of the airplane engine plant was constructed at the expense of the town. The other industrial connection was financed entirely by the industry.

The total cost of the entire program approached $600,000. The work was constructed at peak prices, with early completion a prime factor. Consequently, the value of the facilities measured by prewar or postwar standards would probably be considerably less. If some of the war industries are not active after the war, service to them of course will not be needed. With these facts in mind, the local communities would not have proceeded with the work unless the FWA had stepped in to absorb these excessive costs over normal times, and possible future unneeded facilities. Such a program as here constructed, to be successful, must receive assistance from some agency above the local level unless it can be demonstrated to be self-liquidating.

Proper operation and maintenance of these facilities is required. Title to works constructed 100 per cent by the FWA lies with them. The village of Kenmore has an arrangement to acquire the Mang Avenue pumping station. Disposition of the other elements will no doubt be made after the war. In the meantime the city of Buffalo is operating and maintaining all structures within the city. The mobile pumping units are housed either by the fire department or the water department, and in case of emergency the fire department and the regular auxiliary water department crews will operate them. The Western New York Water Co. maintains all structures on their system. The village of Kenmore operates the Mang Avenue pumping station for water used either in Kenmore or the town of Tonawanda. The maintenance of the other structures is assumed by the local communities in which they are located.

Where connections are made solely for war emergency use and it is intended that the water would be used only in case of emergency, the charges for water might not be important. In the present cases, however, water is being bought and sold daily by some of the agencies, as well as being supplied for emergency use. Buffalo is the chief seller of water. The city sells at established rates to the village of Kenmore, the town of Tonawanda, and the Western New York Water Co., which rates are about twice the rate charged for water to similar users within the city of Buffalo. In the case of the industry for which standby service only is supplied, a standby charge is made comparable to hydrant charges for a property of the size which is being protected.

Since the installation of these facilities, there have been two emergencies. One was a partial blocking of the Western New York Water Co. intake by ice, and the other was a rupture of a 60-in. cast-iron pipe main in the

Buffalo distribution system. In the first case water at the rate of over 7 mgd. was delivered by Buffalo to the outlying systems through various underground connections for a short time. In the second emergency, service was resumed before it was necessary to call for help. If the repair of the break had been delayed an hour longer, help from outside would have been welcome.

The city repair crews were able to work with better speed than in past years because they made use of several truck-mounted valve-turning machines which were purchased with civilian defense funds. The time required for operating a number of large valves was greatly reduced. These two incidents have demonstrated the emergency value of the connections. The daily use of the underground connections has assisted greatly in giving adequate service to industries and communities which otherwise could not have been served from their normal sources of supply.

When the war is over and normal times return, the problem of postwar use of these facilities must be solved in a manner possibly not satisfactory to all parties, but in accordance with decisions of the New York State Water Power and Control Commission.

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### Graphic and Factual Material Relative to the Pacific Theater

**Rear Admiral William R. Munroe, U.S.N., Commandant, Third Naval District, has announced that the New York office of the Navy Intelligence Service is prepared to accept as gifts or loans pictures and maps of areas now under enemy control in the Orient. Any member of the A.W.W.A. possessing photographs or maps concerning Jap controlled areas in the Pacific is requested to communicate with his District Intelligence Officer. The District Office for the states of New York, Connecticut and the northern half of New Jersey is located at 90 Church Street, New York City. Other U.S. Navy District Intelligence Offices are located in Boston, Philadelphia, Norfolk, Charleston, Miami, New Orleans, Chicago, San Diego, San Francisco, Seattle, Annapolis and Washington, D.C.**

**The specific areas of interest are: the Japanese mainland; mandated and other islands, including Korea, Formosa and the Kuriles; Manchuria; the Philippines; occupied China; The Netherlands East Indies; Indo-China; Thailand; Malaya; and Burma.**

**In addition, the Navy wishes to interview persons with first-hand knowledge of the above-mentioned areas.**

# Constructing and Financing Interconnections in New Jersey

*By H. T. Critchlow*

THE New Jersey State Water Policy Commission, under authority of the Emergency Water Supply Act (Chapter 24) approved March 24, 1942, has constructed fifteen interconnections at a total cost of $89,677. About half of the expense was paid by the state and the balance by the owners of the water systems benefited. Eight of the connections, with an aggregate capacity of 112 mgd., are located in the northeastern metropolitan district across the Hudson River from New York City. Seven connections, with an aggregate capacity of 4.4 mgd., are located in the Camden metropolitan area across the Delaware River from Philadelphia. The program was designed to assure dependable water service to all industrial areas in case of a breakdown or other interruption in the delivery of water by the system regularly responsible for service. While this was not a large program so far as total cost is measured, it is believed that a maximum of benefit will be obtained.

The program was primarily the result of a careful survey of the ability of water systems in all built-up areas of the state to meet the water demands that might occur under peacetime conditions. The survey covered a period of two years (1938–1940) and was carried out under authority of the law passed in 1929 establishing the State Water Policy Commission, the pertinent section now known as Revised Statute 58: 1–25, being as follows:

> The Commission may, upon petition or upon its own initiative, after hearing, upon notice, require by order in writing the interconnecting of public water supply systems, whether in public or private ownership, whenever it determines that the public interest requires that such connection be made, and require the furnishing of water by means of any such system to another, upon fair compensation, reasonable rates and just and equitable terms to be prescribed by the Commission, which rates shall be subject to review and adjustment by the board of public utility commissioners.

The North Jersey District Water Supply Commission and the Federal Works Projects Administration cooperated in this work. The results of this survey were summarized by the author in a paper entitled "Water Supply Defense in New Jersey" (Jour. A.W.W.A., 33: 1517 (1941)).

The report based upon the survey seemed destined to take the course of many such documents, i.e., "placed on file for future reference." Former Governor A. Harry Moore and the commission made an honest effort to

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A paper presented on June 15, 1944, at the Milwaukee Conference by H. T. Critchlow, Chief Engr., New Jersey State Water Policy Com., Trenton, N.J.

have some of the more urgent interconnections recommended by the commission's report constructed by owners of the water systems concerned. Ten connections, at an estimated total cost of $38,750, were included, but none were then built.

### Emergency Water Supply Commission

Following the country's entry into the war in December 1941, former Governor Charles Edison on January 9, 1942, appointed the Governor's Emergency Water Supply Commission to determine (1) whether a shortage of water supplies was imminent and (2) what means should be adopted to develop and correlate the available supplies so as to utilize them to the fullest extent and so avoid any crippling of industries or inconvenience to private use by reason of any possible shortage resulting from drought, sabotage or attack. The commission made its final report on March 2, 1942 (in less than two months), and recommended among other things that:

(1) No new major water supplies be established at this time.

(2) The existing systems be made more flexible in their use through the establishment of interconnections and by the elimination of waste.

(3) Certain interconnections as proposed in the State Water Policy Commission's report be constructed.

(4) The State Water Policy Commission be designated to carry out the program by giving it authority to order, after hearing, the construction of essential interconnections, and to order the use of such connections for the transfer of water in emergency; also to fix the payments of construction costs and for water transferred.

(5) The state provides a fund to help finance those projects which would provide substantial benefit beyond the limits of the adjacent systems so connected.

### Emergency Water Supply Act

These recommendations were embodied in the Emergency Water Supply Act approved March 24, 1942 (just 22 days after the report was submitted). The act established a so-called revolving fund of $300,000, which was later reduced to $200,000, and limited the cost of any single project to $50,000. This fund was for construction only. A separate appropriation was made for administration.

Clothed with this authority the State Water Policy Commission proceeded to prepare detailed plans and estimates of cost, with the assistance of the owners concerned, for the interconnections recommended, and to hold formal hearings as required by the act. Some of the projects were constructed and paid for by the owners of the systems, where all the benefit would accrue to such owners. Some projects were constructed and paid for by the state, where the benefit would extend largely beyond the areas served by the two systems so connected. In still others the work and the cost were divided between the state and the owners of the systems. Practically no difficulty was experienced in reaching promptly a satisfactory arrangement for doing the work and dividing the cost. The value of some existing interconnections used as an emergency source of water supply for several towns during an unusual flood in September 1940 in southern New Jersey was still remembered and had a stimulating effect.

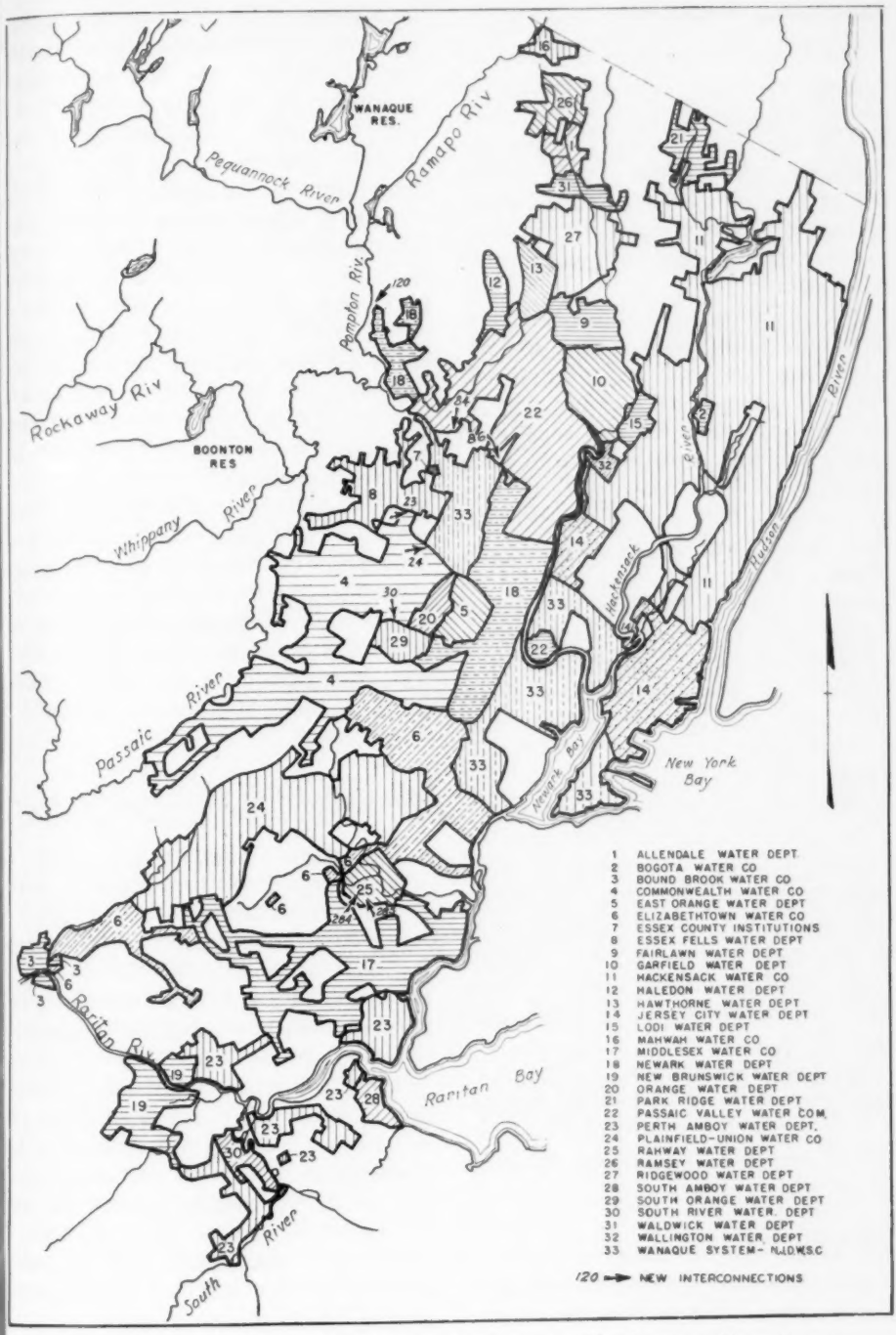


FIG. 1. Interconnections of Water Supply Systems—Northeastern New Jersey

## Emergency Experience

Water has been transferred between systems to relieve drought conditions on two occasions, in the spring of 1941 and in the spring of 1944, when the Wanaque reservoir did not fill during the preceding flood season, and once because of a rupture of a large transmission main feeding an important industrial area. In the former case water was transferred through certain interconnections built prior to the emergency program and over which the commission has certain authority to transfer water, and through some new interconnections. Fortunately in both years drought conditions were broken by heavy rainfall so that the precautions taken could in the end only be charged to insurance and not to actual need. In the case of the emergency caused by a break in a transmission main, existing interconnections were used and water was supplied from three other systems until the repairs were completed and normal service restored. These emergencies occurred in the northeastern metropolitan district.

An electric power failure in the Camden area in the winter of 1944 threatened to call into use some of the interconnections built in this district, but power was restored in less than three hours after failure so an otherwise serious curtailment of supply was avoided.

With this limited use to date, it is gratifying to know that an emergency source of supply is available for use in case of an interruption of service from the normal source.

## Construction

The construction program got under way in April 1942 and the first interconnection was completed in about three weeks. All of the materials for this job were available out of stock. The cost of this first new connection was borne by the owners of the systems connected. The balance of the projects followed as rapidly as permitted during the detailed procedure of making plans, holding hearings, obtaining priorities and awaiting delivery of materials. While separate applications were made to the War Production Board for preference ratings, the entire interconnection program for the two districts—northeastern and Camden—was discussed with the Water Division of the Office of War Utilities, which did much to expedite the delivery of materials. The program was completed by July 1943 except for the completion of the emergency pumping station at interconnection No. 84 at Little Falls, between Wanaque and Rockaway aqueducts. Preference ratings were denied for two other emergency pumping stations and one interconnection.

## Description of Interconnections

A description of each interconnection (Fig. 1) built, its capacity and construction cost follows:

*No. 23—Commonwealth Water Co.-Borough of Verona at the Verona-West Orange Line.* This interconnection was built to provide an emergency source of supply for the Borough of Verona, which purchases water from the Borough of Essex Fells. It is located in an outlying section of each municipality. A small portion of the town of West Orange may be served through this point in case of necessity. The supply and distribution systems of West Orange are owned and operated by the Commonwealth Water Co. The hydraulic grades are about the

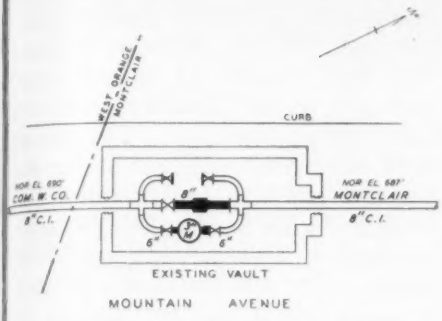


FIG. 2. Interconnection No. 24—Commonwealth Water Co.-Town of Montclair

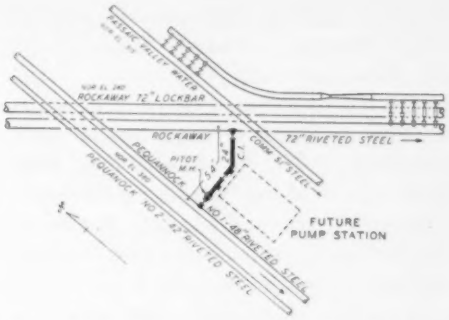


FIG. 4. Interconnection No. 86—Pequannock-Rockaway at Clifton

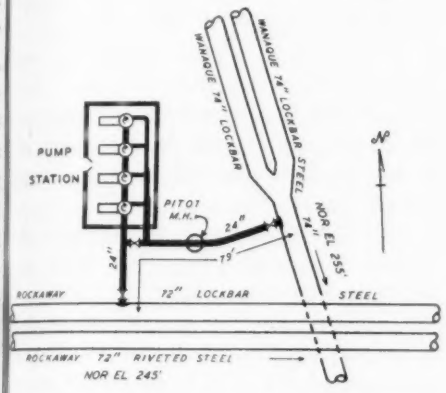


FIG. 3. Interconnection No. 84—Wanaque-Rockaway at Little Falls

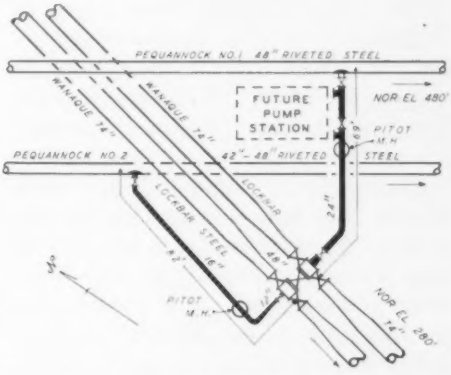


FIG. 5. Interconnection No. 120—Pequannock-Wanaque at Wayne Township

same. Two 6-in. cast-iron pipes are joined by an extension of 47 ft. with two valves and a blanked tee. No meter is installed. The capacity is 300,000 gal. daily. The total cost for the interconnection was $281.

*No. 24—Commonwealth Water Co.-Town of Montclair at the Montclair-West Orange Line* (Fig. 2). This interconnection was built to provide an emergency source of supply for the town of West Orange, which is served by the Commonwealth Water Co. Since the hydraulic grades are practically equal at this point, water may be transferred to the town of Montclair which is one of the eight partners of the Wanaque system. The construction work consisted of the replacement of a connection in a vault which had been discontinued a number of years ago. Two 8-in. cast-iron pipes were joined by nipples and a sleeve, and a 3-in. meter was installed on a 6-in. bypass around the 8-in. junction. The capacity is 500,000 gal. daily. The total cost was $193.

*No. 30—Commonwealth Water Co.-Village of South Orange at the South Orange-West Orange Line.* This interconnection was built to provide an emergency source of supply for the high-service portion of the village of South Orange, which has its own well

system. A 6-in. high-service pipe in West Orange, which is supplied by the Commonwealth Water Co., was connected to a 6-in. extension of a 10-in. line in South Orange by the construction of 130 ft. of 6-in. line, with two valves, along Wyoming Avenue. The difference in hydraulic grades is 80 ft. and the capacity is 300,000 gal. daily. The total cost was $737.

*No. 84 — Wanaque - Rockaway at Little Falls* (Fig. 3). This interconnection was built to transfer water from the Wanaque aqueduct of the North Jersey District Water Supply Commission to the Rockaway aqueduct of Jersey City at their point of crossing in Little Falls Township near Francisco Avenue. It is near the inlet portals of their respective tunnels through First Mountain at Great Notch. The flow is by gravity through a 24-in. diameter cast-iron pipe, 79 ft. long, connected into a previously constructed outlet in a valve chamber on the Wanaque 74-in. steel pipe and entering the Rockaway easterly 72-in. lockbar steel pipe through a wet tap with hat flange. The normal difference in hydraulic grades is 10 ft. and the capacity 25 mgd. Water can also be transferred from the Rockaway to the Wanaque aqueduct by means of an emergency pumping station located on a loop around the main control valve. The pumping station consists of four low-stage centrifugal pumps, with a total capacity of 25 mgd., driven by reconditioned automobile gasoline motors. The total cost was $22,400.

*No. 86—Pequannock-Rockaway at Clifton* (Fig. 4). This interconnection was built to transfer water from the Pequannock aqueduct of the city of Newark to the Rockaway aqueduct of Jersey City at their crossing at Chittenden Road, Clifton. The flow is by gravity through a 24-in. diameter cast-iron pipe, 54 ft. long from the Pequannock No. 1 (easterly) 48-in. riveted steel pipe to the Rockaway westerly 72-in. riveted steel pipe. The former tie-in was made by dewatering the 48-in. pipe, acetylene torch cutting and welding of a hat flange, while the latter was made by a wet tap with welded hat flange. The difference in hydraulic grades is 140 ft. and the capacity 25 mgd. The total cost was $5,295.

A pumping station with a capacity of 25 mgd. was designed so that water might be transferred from Rockaway to Pequannock. This could not be built because of wartime priorities, but a valve and two tees were installed in the 24-in. pipe for use in the event of future construction of the pumping station.

*No. 120—Pequannock-Wanaque at Wayne Township* (Fig. 5). This interconnection was built to transfer water from the Pequannock aqueduct of the city of Newark to the Wanaque aqueduct of the North Jersey District Water Supply Commission at their point of crossing in Wayne Township. The Wanaque supply at this location is carried by two 74-in. lockbar steel pipes. The Pequannock water is delivered through a 48-in. (No. 1) and a 42-in. (No. 2) riveted steel pipe. The 42-in. pipe is enlarged to 48 in. at this point because of an adjacent undercrossing of Pompton River. The flow is by gravity from the No. 1 line through a 24-in. cast-iron pipe, 69 ft. long, to a 36-in. previously installed valve in a cross-over chamber of the Wanaque aqueduct, and from the No. 2 line through a 16-in. cast-iron pipe, 82 ft. long, to a previously installed 12-in. valve in the same chamber. A wet tap was made in both the No. 1 and No. 2 Pequannock lines. The normal

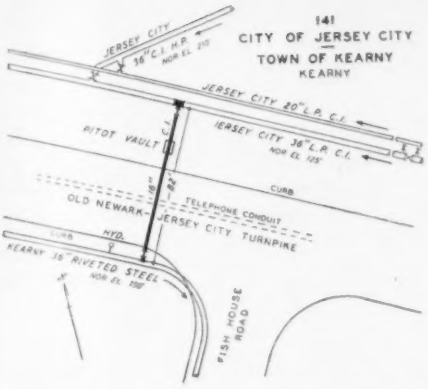


FIG. 6. Interconnection No. 141—City of Jersey City-Town of Kearny at Kearny

difference in hydraulic grades is 200 ft., with a capacity of 25 mgd. for the 24-in. pipe and 14 mgd. for the 16-in. pipe. The total cost was $5,972 for the 24-in. line and $4,500 for the 16-in. line.

A pumping station with a capacity of 5 mgd. was designed to transfer water from the Wanaque aqueduct to the Pequannock No. 1 pipe through the 24-in. pipe. This could not be built because of difficulties in obtaining priorities, but a valve and two tees were installed for use in the event of future construction of the pumping station.

*No. 141—Jersey City-Town of Kearny at Kearny* (Fig. 6). This interconnection was built to transfer water from a 36-in. cast-iron high-pressure line of the Jersey City system to a 36-in. riveted steel pipe of the Kearny system at the corner of Fish House Road and the old Newark-Jersey City Turnpike in the town of Kearny. The flow is through a 16-in. cast-iron pipe, 82 ft. long, laid across the old Turnpike, through wet taps with hat flange to the Kearny pipe, and with sleeve on the Jersey City pipe. The normal difference in hydraulic grades is 60 ft., with a capacity of 16 mgd. Water may also be transferred from the Kearny pipe to the Jersey City low-pressure line at this location. The old Turnpike is covered with a heavy concrete base, asphalt-bound crushed-stone pavement and difficulty was experienced due to a concrete box telephone conduit located at a different elevation than originally reported. Exceedingly heavy truck traffic passed the location to nearby warehouses and industries which caused a temporary detour to be built across the corner. The total cost was $2,129.

*Nos. 284 and 285—Middlesex Water Co.-City of Rahway at Rahway.* These two interconnections of similar design are located in the city of Rahway a little over one-half mile apart. They are used to transfer water from the 20-in. cast-iron pipe of the Middlesex Water Co. to two 12-in. cast-iron pipes of the Rahway distribution system, which were built in conjunction with a large project to extend and strengthen portions of the distribution system. The difference in hydraulic grades is 130 ft. and the capacity of each connection is 3 mgd. The interconnections were equipped with 8-in. meters and 12-in. pressure regulators. The total cost was $26,450.

*No. S-8—City of Camden-New Jersey Water Co. at River Road near Federal Street.* This interconnection was built to provide an emergency source of supply between the Camden 30-in. transmission main from Morris Station and the 12-in. distribution main of the New Jersey Water Co., which lie parallel in River Road near Federal Street, Camden (Fig. 7). A 12-in. wet tap was made on the 30-in. Camden main and a 12-in. tee was cut into the water company main. Con-

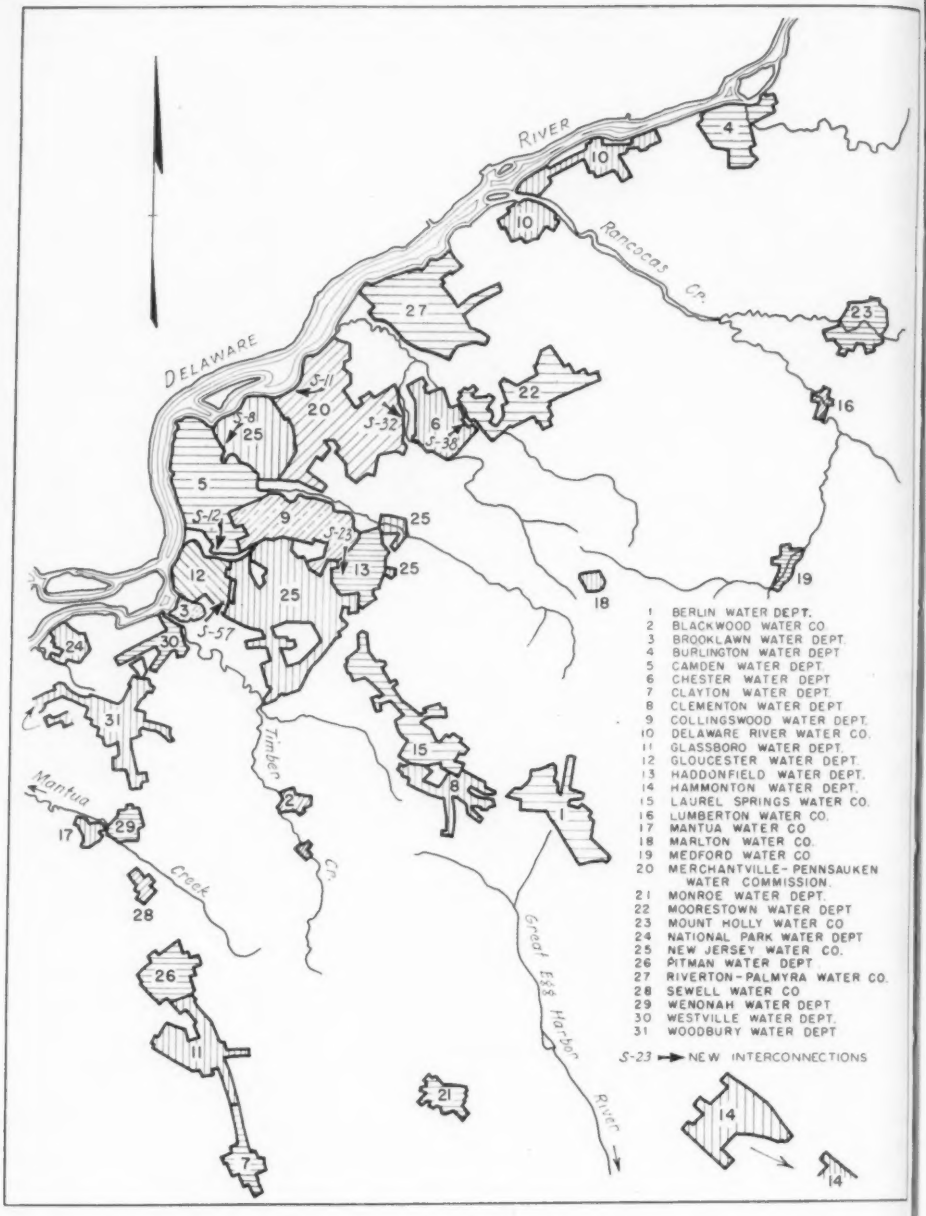


FIG. 7. Interconnections of Water Supply Systems—Camden Area

nection was made between these two points by 24 ft. of 12-in. pipe with two shut-off valves. The difference in hydraulic grade is 25 ft. The capacity is 500,000 gal. daily. The total cost was $1,053. This interconnection may be used in an emergency to supply approximately 1 mgd. to the Camden transmission main.

*No. S-11—City of Camden-Merchantville-Pennsauken Water Commission at River Road* (Fig. 8). This interconnection was built to provide an emergency source of water supply between the Camden 36-in. transmission main from Morris Station and the Merchantville-Pennsauken Water Commission 8-in. dead end at 49th Street in Pennsauken Township. A wet tap was made on the Camden cast-iron pipe in a trench 12 ft. deep and connected to the Pennsauken 8-in. main through 77 ft. of 6-in. pipe, with two shut-off valves. Two hydrants were also installed on 6-in. branches, one on each system, to be used in an emergency for transferring water from the Camden system to the Merchantville-Pennsauken system, using a portable pump and fire hose. Water can be transferred by gravity from the Merchantville-Pennsauken system to the Camden system, the difference in hydraulic grades being 65 ft. The capacity is 1 mgd. The total cost was $1,317.

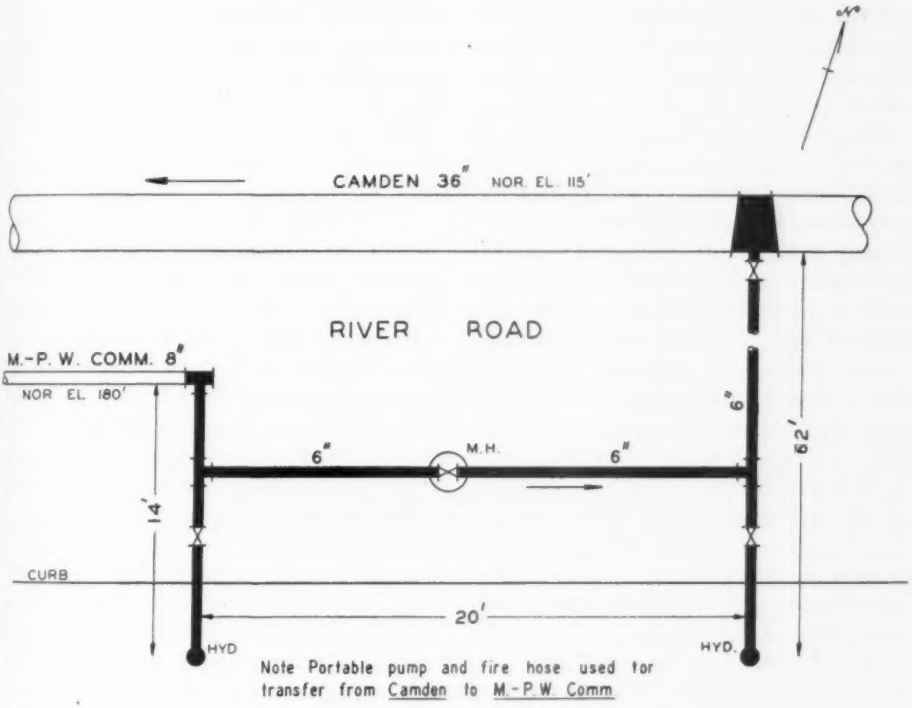


FIG. 8. Interconnection No. S-11—City of Camden-Merchantville-Pennsauken Water Commission

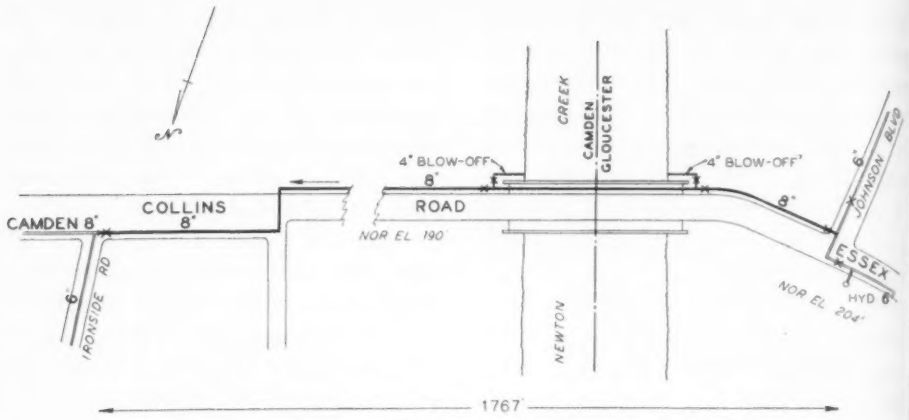


FIG. 9. Interconnection No. S-12—City of Camden-City of Gloucester

*No. S-12—City of Camden-City of Gloucester at Collins Road* (Fig. 9). This interconnection was built to provide an emergency source of supply for the city of Gloucester, which has its own well system. An 8-in cast-iron tee on the Camden loop was connected by 1,767 ft. of 8-in pipe along Collings Road and over a bridge across Newton Creek to a 6-in. loop on the Gloucester system. The connection was made through a tee which was installed between two line valves on the loop, one of which was installed in connection with this project. There are shut-off valves on each side of Newton Creek with 4-in. blow-offs at either end of the stream crossing. The pipe over the bridge was laid underneath the concrete sidewalk. The difference in hydraulic grade is 14 ft. The capacity is 1 mgd. The total cost was $6,962. This interconnection can be used in an emergency to transfer water from Gloucester to the Fairview section of the city of Camden.

*No. S-23—New Jersey Water Co.-Borough of Haddonfield at King's Highway.* This interconnection was built to provide an emergency water supply to the borough of Haddonfield. The interconnection is between the 12-in. Haddonfield distribution main in Ellis Street and the New Jersey Water Co.'s 10-in. distribution main in King's Highway near their crossing. The connection consists of a short 8-in. pipe with two shut-off valves. The static levels are approximately the same. The capacity is 500,000 gal. daily. The total cost was $425.

*No. S-32—Merchantville-Pennsauken Water Commission-Chester Township of Moorestown Pike* (Fig. 10). This interconnection was built to provide an emergency source of supply for the township of Chester, which has its own well system. An 8-in. line 1,567 ft. long is constructed between the 12-in. dead end of the water commission's distribution main in Maple Avenue and the 6-in. dead end of the township distribution main. An 8-in. valve was installed at either end, also on each side of the crossing on Pennsauken Creek. Four-inch blow-offs were also installed at the creek crossing. The difference in hydraulic grade is 35 ft. The capacity is 500,000 gal. daily. The total cost was $5,916. This in-

terconnection may be used in an emergency to supply approximately 200,000 gal. daily to the Merchantville-Pennsauken Water Commission.

*No. S-38—Moorestown Township-Chester Township at Moorestown Pike.* This interconnection was built to provide an emergency source of supply to the township of Chester. A 6-in. dead end of the Chester Township system is connected to a 6-in. dead end of the Moorestown system by 571 ft. of 6-in. pipe, with two shut-off valves, in Moorestown Pike. This project also included laying 1,684 ft. of 6-in. pipe to complete a loop in the Moorestown distribution system, thereby strengthening the interconnection. The hydraulic grades are about the same. The capacity is 300,000 gal. daily. The total cost of the project was $4,883.

*No. S-57—City of Gloucester-Borough of Mount Ephraim at Market Avenue.* This interconnection was built to provide an emergency source of supply for the city of Gloucester, which has its own well system. A 6-in. cast-iron pipe 203 ft. long with two valves was used to connect two 6-in. dead ends on each system. The difference in hydraulic grade is about 60 ft. The capacity is 600,000 gal. daily. The total cost was $1,164. This interconnection can also be used in an emergency to transfer water from Gloucester to Mount Ephraim.

## Joint Operation Board

A separate but important part of this program was the designation of a Joint Operation Board to advise the commission on engineering details of the interconnection program and the joint operation of the water systems in the northeastern metropolitan district. This board was established in July 1942 and consists of the operating heads of the five largest water systems

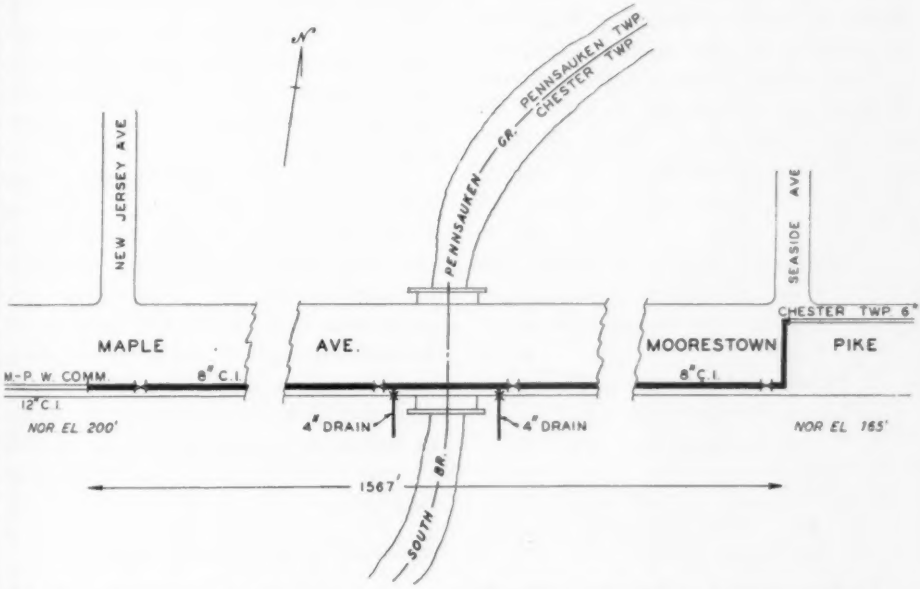


FIG. 10. Interconnection No. S-32—Merchantville-Pennsauken Water Commission-Chester Township

in the northeastern district, all members of the American Water Works Association, as follows:

Charles H. Capen, Chief Engr., North Jersey District Water Supply Com.
William G. Banks, Div. Engr., Newark Water Dept.
Harold M. Ohland, Hydr. Engr., Jersey City Water Dept.
Richard E. Bonyun, Gen. Supt., Passaic Valley Water Com.
Charles Alfke, Gen. Mgr., Hackensack Water Co.

*Service Interruption Schedules*

This board prepared service interruption schedules to be followed in case emergency transfer of water and joint operation of the systems became necessary during the war. The commission's engineering staff made special field surveys and prepared tentative schedules which were reviewed by the Joint Operation Board in conferences with the operating heads of the several water systems concerned. Final schedules were adopted and confidential copies delivered to each of the operators concerned. These schedules include basic information for each of the water systems in the district, as follows:

1. Source of supply, including safe yield, maximum capacity, normal demand and delivery elevation.
2. Impounding storage.
3. Local storage.
4. Booster station.
5. Reserve supplies.
6. Interconnections to adjacent supplies, with interconnection numbers and capacity.
7. Area served with normal demand allocated by municipalities.
8. Description and maximum capacity of major delivery mains.

For any particular service interruption the following are listed:

1. Supply lost or out of service.
2. Effect on service.
3. Substitute supply required.
4. Local demand to be supplied.

5a. Preferred procedure — outlining in detail procedure to be followed.

5b. Alternate procedure.

6. Responsibility of agencies affected.

A total of 163 interruption schedules have been prepared for 24 of the water systems in the district covered by this program.

*Catalog of Interconnections*

Another tool prepared for this work is a detailed map of the district showing (1) sources of supply, (2) transmission mains, (3) territory supplied, and (4) location of all interconnections; also tables of interconnections listed numerically and alphabetically by water systems for each interconnection (Table 1).

A total of 270 interconnections are thus cataloged for quick reference. From this it will be seen that this district was supplied with many interconnections before the emergency program was instituted. Of the 270 interconnections, 107 are in regular service between adjacent systems, leaving 163 available for emergency. Many of the latter were found to be of little value or their usefulness superseded by newer connections.

*Emergency Operation Center*

An Emergency Operation Center is maintained in the center of the district

Water Supply Interconnections

| No. | Water Supply | Municipality | Location | Size of Mains—in. | Size of Interconnection—in. | Size of Meter | Check Valve Against Supply to Interconnection | Pressure Regulator | Delivery Capacity to Interconnection—mgd. (Normal Flow to) | Delivery Elevation | Condition | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120A | North Jersey Dist. W.S.C., Newark (Pequannock) | Wayne Twp. | Near Pompton River Crossing of Newark Main | 2-74 | 12–16 | None | None | Not in use | 14.0 | 280 | Good | Wanaque Transmission Mains, Cross-connected |
| 120B | North Jersey Dist. W.S.C., Newark (Pequannock) | Wayne Twp. | Near Pompton River Crossing of Newark Main | 42<br>2-74 | 24 | Pitot Tube<br>None | None | None | 0.0<br>25.0 | 480<br>280 | Good | Pequannock 42-in. Main No. 2<br>Wanaque Transmission Mains, Cross-connected |
| 298 | North Jersey Dist. W.S.C., Passaic Val. Water Com. | Totowa | Little Falls Pumping Station | 48<br>2-74<br>48 | 48 | Pitot Tube<br>Venturi Meter<br>No By-pass | On P.V. W.C. Pumps | None<br>Wanaque Pumps, 60.0 mgd. total capacity | 0.0<br>60.0 N<br>Total | 480<br>260<br>340 (Wanaque Disch.)<br>215 (Industrial Disch.) | In Use | Pequannock 48-in. Main No. 1<br>Wanaque Transmission Mains, Cross-connected<br>48-in. Suction Line to Wanaque Pumps, Cross-connected to 48-in. Discharge Line From Industrial Pumps |
| 84 | North Jersey Dist. W.S.C., Jersey City | Little Falls | Francisco Ave. near N. Portal of G. N. Tunnel | 1–74<br>1–72 | 24 | None<br>Pitot Tube | On Booster Pumps only | 4 Booster Pumps, 25 mgd. total capacity | 25.0<br>25.0 | 255<br>245 | Good | Wanaque 74-in. Transmission Main<br>Northerly Lockbar Line, J. C. Transmission Mains |
| 291 | North Jersey Dist. W.S.C., Newark (Pequannock) | Belleville | Belleville Reservoir | 74<br>30 | 30 | Venturi Meter<br>No By-pass | None | 30-in. and 20-in. By-pass | 20.0<br>20.0 N | 235<br>340 | Good | Wanaque Transmission Main To Belleville Res. and Newark and Belleville L. S., Cross-connected to Pequannock 42-in. and 48-in. Mains, P.V.W.C. 51 in. and Belleville High Service |
| 137 | North Jersey Dist. W.S.C., Kearny* | Belleville | Belleville Reservoir | 74 | 48 | Venturi Meter<br>No By-pass | None | None | 0.0 | 235 | In Use | Wanaque Transmission Main Normal Supply to Kearny and Bayonne |
| 136 | North Jersey Dist. W.S.C., Newark (Pequannock) | Belleville | Belleville Reservoir | 48<br>74<br>60 | 48 off<br>3–30 and 2–36 | Venturi Meter | None | 2–30 in. and 48-in. By-pass | 25.0 N<br>15.0<br>60.0 N | 235<br>235<br>340 | In Use | Wanaque Transmission Main Normal Supply to Newark and Elizabeth, Cross-connected to Pequannock Supply via I.C. 136A |
| 136A | North Jersey Dist. W.S.C., Newark (Pequannock) | Belleville | Belleville Reservoir | 74<br>36 | 20 | None | None | None | 15.0<br>10.0 | 235<br>340 | Good | Wanaque Transmission Main Off Pequannock 42-in. and 48-in. Mains to Cedar Grove 60-in. H.S. Main |
| 118 | North Jersey Dist. W.S.C., Bayonne* | Kearny | Schuyler Ave. and Seeley Ave. | 42<br>48 | 48 | Venturi Meter<br>No By-pass | None | 16 in. and 24 in. P.R. on By-pass at Arlington G.H. | 15.0<br>20.0 N | 215<br>155 below P.R. | In Use | Wanaque 48-in. off Kearny 42-in. Wanaque Supply Main to Bayonne |
| 141 | Kearny* (Wanaque), Jersey City | Kearny | Fish House Rd. at old Belleville Tpk. | 36<br>36 | 16 | None<br>Pitot Tube | None | None | 16.0<br>16.0 | 150<br>210 H.S.<br>125 L.S. | Good | Supply Main to Kearny Meadows To 36-in. H.S. off Boonton Mains and 36-in. L.S. off Distribution Res. |
| 28 | Kearny* Bayonne* | Kearny | Central Ave. at Pennsylvania Ave. | 30<br>48 | 20 | None | None | None | 15.0<br>15.0 | 145<br>145 | Good | Supply Main to Kearny Meadows Wanaque Supply Main to Bayonne |

* Owns distribution system but no source of supply. Buys water wholesale.

January 1, 1944

with a regular staff of three and a reserve staff of three. Each member of the Joint Operation Board is on duty one week in rotation. Unlisted telephones are available for alerting the staff, of which at least one is on duty at all times. Any interruption in service is reported, generally by the water department concerned, to the Joint Operation Center. The staff member on duty alerts the remainder of the staff and contacts the board member on duty who takes charge and directs the operation until the emergency is over.

## Conclusion

The success and value of this program of intersystem connections can be attributed to (1) the prewar planning for peacetime construction of worth-while projects; (2) the necessity for maximum protection and dependability of water service under war conditions; (3) the co-operation of (*a*) the state officials in granting the necessary authority; (*b*) the local water works management and operators; and (*c*) the constructors who did the work; and (4) the War Production Board which issued the necessary priorities for the necessary critical materials. The wise use of these facilities for the duration of the war rests with the State Water Policy Commission, and in the peace which it is hoped will soon follow, with the local water works men. They can be depended upon to continue their good work in maintaining dependable and safe water service.

# The Economics of Electrical Power Pumping

*By C. A. Richardson*

THE well-engineered water works plant must provide for a wide range in capacity to meet both minimum and peak demands. In the early stages of water works development, steam pumping engines were almost universally used and the necessity of operating over a wide range of conditions did not present any particular problems. Now that motor-driven centrifugal pumps are displacing other types of pumping equipment, the problem of variable demand requires careful consideration in order to make sure that the most economical arrangement is provided.

The most common methods of providing for variable demand are:

1. Elevated storage tanks.
2. Multiplicity of pumping units (varying capacity) operating in parallel.
3. Steam turbine-driven units.
4. Throttling.
5. Variable speed electrical motors.
6. Constant speed electrical motors with variable speed couplings.

The factors that enter into the selection of the proper type of drive for an economic installation are many. In this discussion remarks are limited to the following methods: (1) throttling, (2) variable speed electrical motors, and (3) constant speed electric motors with variable speed couplings.

A paper presented on June 15, 1944, at the Milwaukee Conference by C. A. Richardson, Application Engr., Centrifugal Pump Dept., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

## Throttling

When centrifugal pumps are operated at constant speed at or near constant discharge pressure for variable capacity demands, this is in effect throttling, whether or not there has been a change in discharge valve setting. Under these conditions the slope of the characteristic curve should be carefully considered to make sure that the characteristics are best for desired operating conditions. Under such conditions a flat head curve is desirable. If the pump is discharging against a wide variation in discharge head a steep head curve is preferable.

The head capacity Curves A and B (Fig. 1) illustrate the difference in centrifugal pump performance for head curves with comparatively flat and steep characteristics. Should one of two centrifugal pumps, with characteristics as shown by Curves A and B, be considered for operating over a wide range in capacity against constant or reduced heads at constant speed, then it is obvious that the flat head curve is preferable. If the pumps are to operate against a wide variation in discharge pressure a steep head curve is preferable.

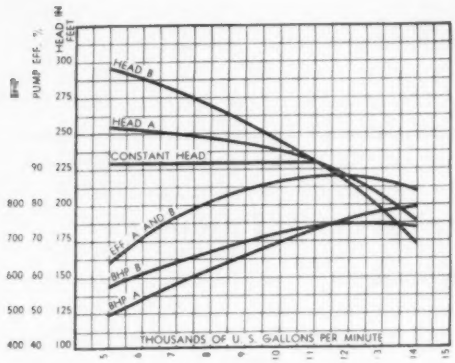


FIG. 1. Characteristics of 16-mgd., 230 ft. Head, Single-Stage Centrifugal Pump at 900 rpm.

Table 1 gives comparative data for constant and variable speed for constant discharge pressure operating conditions. This tabulation shows that a flat head characteristic has the advantage for devices where slip losses are proportional to the reduction in speed. This is due to the fact that the speed reduction required to meet a specific condition is less for a flat head curve than for a steep head curve. The effect of slip losses for increased speed reduction will be partially offset by increased pump efficiency, provided that the corresponding point for constant speed is back of the best point of efficiency. For example, at the 52-per cent capacity, 230-ft. constant head point the pump efficiency is 72 per cent for Curve A and 74 per cent for Curve B. However, if the corresponding point at reduced speed is beyond the best point of efficiency on the normal speed curve, the pump efficiency will be less at reduced speeds.

For devices where the reduction in efficiency is not proportional to change in speed, such as with a d-c. motor, the steep head characteristic has the advantage. This difference is due to increased pump efficiency as outlined above.

From the tabulation in Table 1 the following kilowatt power saving is obtained for variable speed over constant speed at 52-per cent capacity:

| | *Curve A* | *Curve B* |
|---|---|---|
| Wound rotor induction motor | 24.6 kw. | 73.0 kw. |
| D-c. motor and rectifier | 20.9 kw. | 91.8 kw. |
| Synchronous motor and variable speed coupling | 11.9 kw. | 58.2 kw. |

The kilowatt saving at other points can be similarly obtained. The value of these savings in dollars is dependent on savings for energy costs that can be made on an average yearly basis, and the capitalization of energy savings.

## Variable Speed Electric Motors

On installations requiring only 5- to 10-per cent speed reductions to meet the desired demands, the merits of the variable speed drive over the constant speed drive may be hard to justify due to the greater initial cost. This question is one that should be carefully studied when new equipment is to be purchased.

However, on installations requiring over 20-per cent speed reduction no mathematical contortions are necessary to justify the installation of variable speed equipment. It is more or less evident from the outset that a variable speed installation will pay dividends if a good percentage of the operation is at considerably reduced conditions. Such an installation is illustrated in Fig. 2, covering two single-stage pumps in series, rated at 8 mgd. against a 382-ft. total head operating down to 4.15 mgd. against a 294-ft. head.

The energy saving shown in Table 2 clearly indicates that some type of variable speed drive will pay dividends.

The question here is what form of variable speed arrangement will prove most advantageous. The most economical arrangement for variable speed depends somewhat on local conditions. Figure 3 indicates the comparative energy savings for various arrangements.

Curve E represents the energy input that would be obtained with a unity-power-factor, 1,800-rpm. synchronous motor using texrope motion-control variable speed drive. This arrangement would be the most economical from an energy standpoint, if a variable speed drive of this magnitude were available in a commercial unit. This drive would greatly exceed present-day established limits in belt speeds and sizes. The limitations in belt speed could be overcome by choosing a 1,200-rpm. motor and a pumping unit with a top speed of 1,200 to 1,400 rpm. The pump efficiency at 1,200 rpm. would be lower than at 1,800 rpm. The synchronous motor at 1,200 rpm. would cost less than at 1,800 rpm.

TABLE 1

*Comparative Data on 16-mgd., 230-ft. Head Centrifugal Pump Unit Operating at 900 rpm., With Control*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Operating conditions—Constant head (230 ft.) at pumping station | Capacity, % | | 52.0 | 60.0 | 68.0 | 76.0 | 84.0 | 92.0 | 100.0 |
| | Capacity, *gpm.* | | 5770 | 6660 | 7550 | 8440 | 9330 | 10200 | 11100 |
| | Head, *ft.* | | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Constant speed, unity power factor, synchronous motor (approximate unit cost, $11,300) | Pump discharge, *hd. ft.* | *A | 253 | 251 | 248 | 245 | 242 | 237 | 230 |
| | Pump discharge, *hd. ft.* | *B | 291 | 283 | 275 | 265 | 254 | 243 | 230 |
| | Ehp. input | A | 560 | 592 | 627 | 657 | 709 | 746 | 782 |
| | Ehp. input | B | 642 | 666 | 694 | 708 | 743 | 764 | 782 |
| | Combined efficiency, % | A | 65.8 | 71.2 | 75.5 | 79.7 | 80.4 | 82.0 | 82.5 |
| | Combined efficiency, % | B | 66.2 | 71.5 | 75.7 | 79.9 | 80.5 | 82.1 | 82.5 |
| | Kwhr./mg. | A | 1209 | 1108 | 1032 | 967 | 948 | 908 | 877 |
| | Kwhr./mg. | B | 1380 | 1242 | 1142 | 1042 | 992 | 930 | 877 |
| Variable speed, constant head, wound rotor induction motor with secondary control (approximate unit cost, $18,200) | Rpm., % | A | 95.4 | 95.9 | 96.4 | 97.1 | 97.6 | 98.6 | 100.0 |
| | Rpm., % | B | 89.7 | 91.1 | 92.6 | 94.2 | 95.9 | 97.7 | 100.0 |
| | Ehp. input | A | 527 | 564 | 602 | 647 | 695 | 742 | 790 |
| | Ehp. input | B | 544 | 582 | 629 | 663 | 705 | 750 | 790 |
| | Combined efficiency, % | A | 63.6 | 68.5 | 72.8 | 75.8 | 78.0 | 79.8 | 81.5 |
| | Combined efficiency, % | B | 61.6 | 66.4 | 69.8 | 73.9 | 77.0 | 79.0 | 81.5 |
| | Kwhr./mg. | A | 1138 | 1050 | 992 | 953 | 926 | 905 | 887 |
| | Kwhr./mg. | B | 1174 | 1088 | 1035 | 978 | 938 | 915 | 887 |
| Variable speed, constant head, d-c. motor and rectifier, using shunt field control (approximate unit cost, $34,900) | Ehp. input to rectifier | A | 532 | 573 | 618 | 670 | 724 | 781 | 844 |
| | Ehp. input to rectifier | B | 519 | 562 | 612 | 667 | 722 | 781 | 844 |
| | Combined efficiency, % | A | 63.0 | 67.5 | 71.0 | 73.2 | 75.0 | 75.9 | 76.4 |
| | Combined efficiency, % | B | 64.5 | 68.7 | 71.8 | 73.5 | 75.2 | 75.9 | 76.4 |
| | Kwhr./mg. | A | 1149 | 1070 | 1020 | 987 | 964 | 952 | 946 |
| | Kwhr./mg. | B | 1120 | 1052 | 1008 | 983 | 961 | 952 | 946 |
| Variable speed, constant head, synchronous motor with variable speed coupling (approximate unit cost, $17,750) | Rpm., % | A | 92.8 | 93.2 | 93.7 | 94.2 | 94.8 | 95.8 | 97.2 |
| | Rpm., % | B | 87.2 | 88.6 | 90.0 | 91.6 | 93.2 | 95.0 | 97.2 |
| | Ehp. input | A | 544 | 582 | 623 | 672 | 720 | 764 | 812 |
| | Ehp. input | B | 564 | 602 | 640 | 687 | 729 | 772 | 812 |
| | Combined efficiency, % | A | 61.5 | 66.4 | 70.4 | 73.1 | 75.3 | 77.6 | 79.4 |
| | Combined efficiency, % | B | 59.3 | 64.2 | 68.4 | 71.4 | 74.3 | 76.8 | 79.4 |
| | Kwhr./mg. | A | 1175 | 1090 | 1028 | 989 | 960 | 932 | 910 |
| | Kwhr./mg. | B | 1220 | 1128 | 1058 | 1013 | 974 | 941 | 910 |

* Curves A and B, Fig. 1.

The over-all width of the sheaves for such a drive would be approximately 6 ft. While no sheaves of this face width have been built for motion-control drives, there is a possibility that such a drive could be designed in the future that would satisfactorily meet these requirements.

With the two sheaves being motion controlled and operated together a speed reduction of 25 per cent is obtainable. The center distance would not change but it would be necessary to provide for adjustment to allow for stretch in the belts. The center distance would be approximately 65 in.

Water works engineers naturally prefer the direct-connected unit; however, the texrope drive with motion control has merit. The efficiency of

TABLE 2

*Comparative Data on 8-mgd., 382-ft. Head Series Centrifugal Pump Unit at 1800 rpm., With Control*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Operating conditions—Variable head at pumping station | Capacity, %<br>Capacity, *gpm.*<br>Head, *ft.* | 52.0<br>2890<br>294 | 60.0<br>3340<br>302 | 68.0<br>3780<br>312 | 76.0<br>4225<br>323 | 84.0<br>4670<br>336 | 92.0<br>5116<br>356 | 100.0<br>5560<br>382 |
| Constant speed, unity power factor, synchronous motor (approximate unit cost, $10,800) | Pump discharge, *hd. ft.*<br>Ehp. input<br>Combined efficiency, %<br>Kwhr./mg. | 474<br>503<br>69.0<br>2160 | 464<br>538<br>72.8<br>2005 | 451<br>564<br>76.2<br>1860 | 438<br>594<br>79.8<br>1725 | 420<br>618<br>80.2<br>1647 | 402<br>638<br>81.3<br>1550 | 382<br>659<br>81.3<br>1471 |
| Variable speed, wound rotor induction motor with secondary control (approximate unit cost, $14,550) | Rpm., %<br>Ehp. input<br>Combined efficiency, %<br>Kwhr./mg. | 80.5<br>367<br>58.5<br>1580 | 82.5<br>404<br>63.1<br>1505 | 85.2<br>448<br>66.5<br>1473 | 88.2<br>493<br>70.3<br>1445 | 91.3<br>543<br>73.0<br>1447 | 94.5<br>606<br>75.8<br>1485 | 100.0<br>666<br>80.3<br>1491 |
| Variable speed, d-c. motor and rectifier using shunt field control (approximate unit cost, $30,800) | Ehp. input<br>Combined efficiency, %<br>Kwhr./mg. | 319<br>67.3<br>1372 | 364<br>70.1<br>1355 | 417<br>71.6<br>1370 | 471<br>73.2<br>1389 | 534<br>74.2<br>1425 | 614<br>74.8<br>1495 | 727<br>75.7<br>1585 |
| Variable speed, synchronous motor, variable speed coupling (approximate unit cost, $15,700) | Rpm., %<br>Ehp. input<br>Combined efficiency, %<br>Kwhr./mg. | 78.4<br>378<br>56.8<br>1625 | 80.2<br>420<br>60.7<br>1563 | 82.8<br>463<br>64.4<br>1522 | 85.7<br>509<br>67.6<br>1505 | 88.7<br>564<br>70.4<br>1501 | 91.9<br>626<br>73.5<br>1522 | 97.2<br>703<br>78.2<br>1535 |
| Variable speed, synchronous motor; variable speed coupling on one pump, other pump constant speed (approximate unit cost, $13,800) (see Fig. 3) | Rpm.—one pump, %<br>Ehp. input<br>Combined efficiency, %<br>Kwhr./mg. | 52.5<br>359<br>59.7<br>1548 | 58.8<br>400<br>63.7<br>1490 | 65.8<br>450<br>66.2<br>1482 | 72.9<br>493<br>69.8<br>1457 | 80.0<br>545<br>72.7<br>1450 | 88.6<br>605<br>76.0<br>1474 | 97.25<br>673<br>79.7<br>1505 |

The approximate prices given for the various arrangements cover:
Pump—Base and coupling.
Motor—Synchronous (unity-power-factor, induction wound rotor) direct current, 600 v.
Starter—Reduced voltage.
Variable speed coupling—Where used standard commercial unit.

Characteristics a.c. Supply—2300–3–60

the drive would be 98 per cent, and this 98-per cent efficiency would be maintained over the entire range in speed. The energy economy of this arrangement should be of interest to the water works engineer, particularly on smaller variable speed installations having high energy rates. The initial cost of this arrangement probably would not greatly exceed other types of variable speed arrangement.

Curve D is the a-c. energy input to a mercury arc rectifier with d-c. shunt field control motor. This standard commercial arrangement is the most efficient of those listed in Table 2, for speeds below 92 per cent normal as compared to the wound rotor induction motor, and for speeds below 97 per cent normal as compared to the synchronous motor with variable speed coupling. The efficiency of the d-c. motor is also slightly lower than the unity power factor synchronous motor.

The efficiency of the rectifier is practically constant for constant d-c. voltage output. In other words, if the output d-c. voltage of the rectifier is held constant, an efficiency of approximately 94 per cent will be maintained for wide variation in load.

The power factor on the a-c. side of the rectifier will be approximately 93 per cent for constant output d-c. voltage. If the output voltage is reduced for speed control on the d-c. motor,

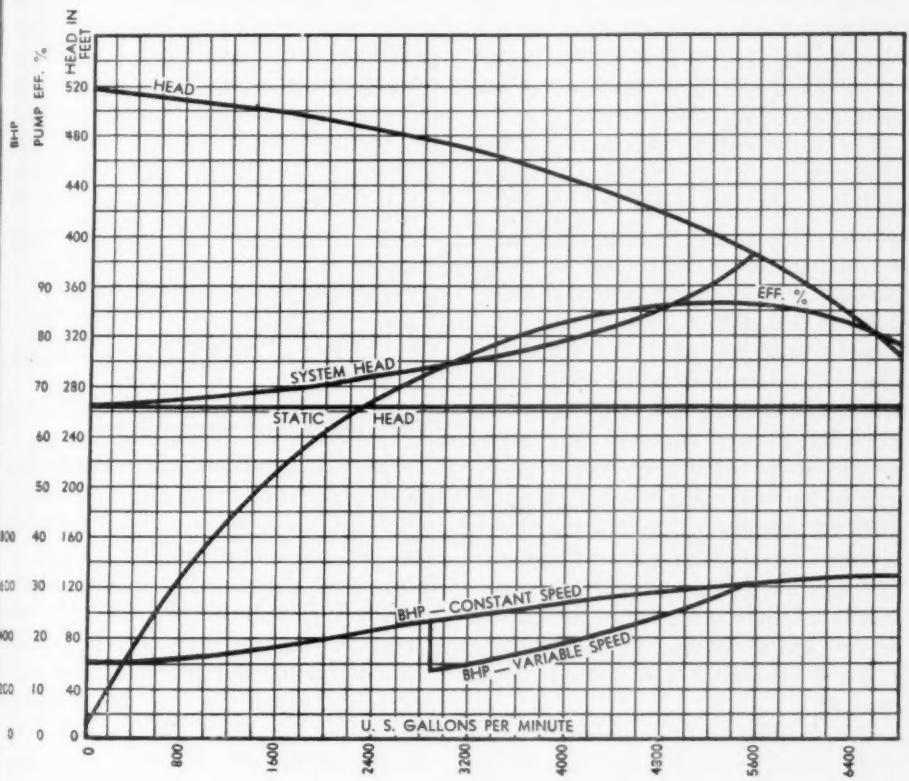


FIG. 2. Characteristics of 8-mgd., 382-ft. Head Series Unit at 1800 rpm.

then the power factor will vary approximately in proportion to the reduction in d-c. voltage.

The efficiency of a d-c. motor with shunt field control will vary with reduction in speed and load. For the minimum condition given in Table 2 of 80 per cent normal speed and approximately 40 per cent normal load, the change in d-c. motor efficiency is approximately a 5-per cent reduction as compared to full load and normal speed. If the commutator voltage on a d-c. motor is reduced 20 per cent to obtain the 20-per cent reduction in speed there is a greater drop in d-c. motor efficiency, and for these conditions the change in d-c. motor efficiency will be approximately 10 per cent as compared to full load and normal speed. This makes it desirable to use shunt field control for speed variation when operating conditions permit.

The initial cost of this arrangement is somewhat greater than the other methods of providing for variable speed. This is due to the necessity of converting from alternating to direct current. Where direct current is available the d-c. motor provides the most efficient method for variable speed. The cost of the d-c. motor with shunt field speed control will be greater than for voltage speed control. The speed on the shunt field d-c. motor is increased by weakening the field, whereas with voltage speed control the speed is reduced by reducing the voltage. In this case a 700-hp. 1,400-rpm., d-c. motor is required for shunt field speed control and a 700-hp., 1,750-rpm., d-c. motor is required for voltage speed control.

This arrangement provides infinite speed points and the speed can be set at any desired operating condition and it will remain constant even though there is a change in pump conditions. The merits of this arrangement are more pronounced the greater the speed reduction required, and the margin in initial cost will be less the larger the unit.

Curve C is the energy input to a wound rotor induction motor with secondary control. This is probably the most common of the variable speed drives, and its economy and cost is on a par with other arrangements. The reduction in efficiency for reduced speeds is proportional to the percentage speed reduction and the power factor will also drop. Standard commercial secondary controls above 500 hp. have a maximum of seven steps with six speed points. In order to secure best results the reduced speed points must be carefully chosen. The wound rotor motor is sensitive to changes in voltage, frequency and horsepower output, but slight changes in operating conditions will not materially affect the over-all economy of centrifugal pump operation. Consequently the wound rotor induction motor gives a very satisfactory variable speed drive for centrifugal pumps. It probably is the simplest of variable speed arrangements.

## Variable Speed Couplings

Curve B is the energy input to a unity power factor synchronous motor with variable speed coupling connected between the motor and series pumps. The speed change affects both pumps equally. The efficiency of this arrangement is less than for the wound rotor induction motor. This is due to the initial efficiency loss at minimum slip in the coupling. The calculations for the tabulation are based on values using hydraulic coupling. The economy of the magnetic coupling would

compare favorably with the hydraulic coupling. However, the published methods for determining the efficiency indicate that slightly higher efficiency would be obtained with hydraulic coupling than with magnetic coupling.

The magnetic coupling requires direct current for excitation which makes it necessary to furnish the synchronous motor with an oversize exciter.

Seven hundred horsepower is just about the maximum size of hydraulic coupling available at 1,750 rpm. Larger sizes are available at lower speeds. No standard commercial magnetic couplings are available in this size.

The magnetic and hydraulic couplings offer infinite speed points for variable speed and they are subject to the same performance factors as the wound rotor induction motor.

Figure 4 shows performance with a variable speed coupling connected between the two series pumps. One pump will operate at constant motor speed and the other at variable speed. The efficiency of this arrangement is practically the same as for the wound rotor induction motor.

Since the greater part of the head to be developed by the variable speed pump is friction head, the pump will

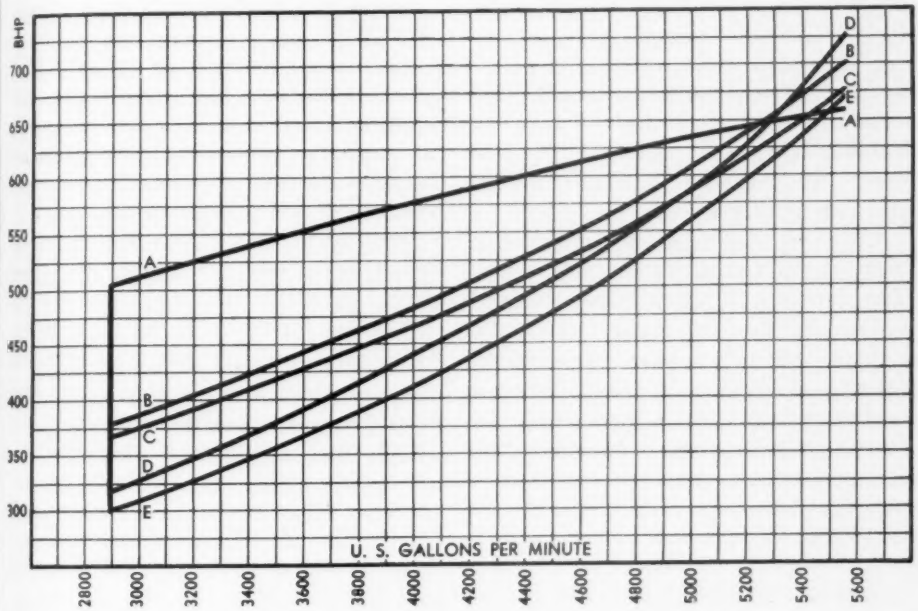


FIG. 3. Comparison—Adjusting Pump Speed Over Throttling Discharge

Curve A—Horsepower Input Constant Speed, Throttling for Reduced Capacity.
Curve B—Horsepower Input Variable Speed, Synchronous Motor Hydraulic Coupling Both Pumps.
Curve C—Horsepower Input Variable Speed, Wound Rotor Induction Motor.
Curve D—Horsepower Input Variable Speed, d-c. Motor and Rectifier Using Shunt Field Control.
Curve E—Horsepower Input Variable Speed, Synchronous Motor With Variable Speed, Constant Efficiency Mechanical Speed Reducer.

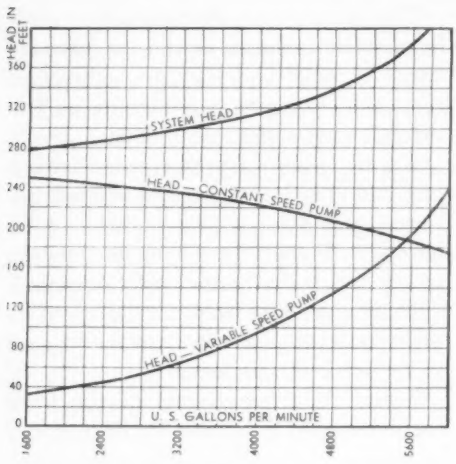


FIG. 4. Head Developed When One Pump Operates at Constant Speed and One Pump at Variable Speed

operate at constant maximum efficiency for all conditions shown in Table 2. This is the preferable arrangement using variable speed couplings and series pumps.

Curve A is the energy input to a unity-power-factor synchronous motor. The capacity variations are obtained by throttling. The head loss in the throttle valve to obtain the desired capacity is obtained by subtracting the corresponding system head from the corresponding pump head. For 52-per cent capacity this head loss is 474 pump discharge head less 294 system head, or 160 ft. The energy saving for the wound rotor induction motor as compared to throttling at this point is 100 kw., which, on the basis of 1¢ per kwhr., is a saving of $1.00 for every hour the unit is operated at this capacity. The saving at other points will be proportional to the operating point as compared to normal rating.

Inasmuch as most water works are required both to provide for maximum demands and to operate at somewhat reduced rates much of the time, some provision for variable demands should be made.

## Summary

From the above it is evident that when centrifugal pumping units are required to operate over a wide range in capacity at constant or reduced heads, some form of variable speed arrangement will pay dividends.

Indications are that there may be new types of mechanical variable speed drives available for horsepowers of 5,000 bhp. in the near future and investigations indicate that the electronic motor, where the commutator and brushes are replaced by electronic tubes, holds promise for the future.

# The Camp Robinson Water Supply Line

*By W. L. Patterson*

CAMP Joseph T. Robinson is located about six miles north of Little Rock, Ark. The Arkansas River, flowing east and south, lies between the city and the camp.

One of the immediate and pressing needs, in the order of camp facilities required, was the provision of an adequate water supply. The logical source of supply was from the new treatment plant at Little Rock, where an ample and excellent supply of mountain water had recently been provided. In order to utilize this supply it was necessary to build a pipeline from the Little Rock treatment plant to Camp Robinson. Construction was begun in the fall of 1940.

With admirable foresight as to availability for the season's construction program and to insure early delivery of materials, Washington had placed orders for pipe, couplings and a few gate valves before field engineering was under way. After field work was started, studies were begun immediately to complete the design in order that final material additions could be ordered promptly.

Pipe for the supply line was 16-in. od. steel, of $\frac{3}{8}$-in. wall thickness. At the mill, it was coated and wrapped with a coal-tar primer, a coat of hot coal-tar enamel, a bonded asbestos-felt wrapper and an 80-lb. Kraft paper covering. The interior lining was a coat of coal-tar primer and a hot coat of coal-tar enamel. Both coatings are in accordance with A.W.W.A. Specifications No. 7A-6. Steel pipe joints were coupled with bolted, gasket, compression-type sleeve couplings.

## Location of Site

Preliminary data prior to the start of construction surveys had been the basis of the pipe order of 37,000 ft. One of the first steps in the field design was a detailed check of the preliminary location of the entire supply line. As a result of this study the line south of the Arkansas River, from treatment plant to river, was relocated. The length of the line was reduced 750 ft. and the final location was safer from possible damage by flood and subsequent channel changes. The safety from flood damage was a most important point since floods on the Arkansas are numerous and powerful and the location of the river is constantly changing. Final location of the line and development of the camp plan reduced the required length of supply line to about 28,000 ft. The pipe order was revised and deliveries were based on the revised requirements.

A paper presented on June 15, 1944, at the Milwaukee Conference by W. L. Patterson, Office Engr., Black & Veatch, Cons. Engrs., Kansas City, Mo.

The location of the river crossing was carefully selected. A site was finally chosen where it appeared that the river bed was fixed and the current was directed against a rock outcrop on the left bank of the river. The crossing was designed to include duplicate 12-in. lines, to provide a safety factor in case one crossing line might fail. The crossing required 2,800 ft. of 12-in., cast-iron, 250-lb., ball-and-socket pipe. Valves were provided to allow operation through either line.

Navigation requirements stipulated a 10-ft. channel below mean low water at an elevation of 220 ft. for a channel width of 180 ft. Bank approaches were carefully studied to allow grades for pipe laying which would not require a joint deflection exceeding 15 deg. per joint of pipe. Prior to selecting a final location for the crossing, a series of borings and soundings were made to determine the best route of approach on the river banks. The lines were finally located, curved upstream, so that the upstream line was 400 ft. from the lower line at the apex of the curves. It was decided that the pipe in the river bed should be placed at least 3 ft. below the existing river bottom, as a precautionary measure to prevent damage from floating material and local scour. In the Arkansas River, a portion of the sandy bed actually goes into suspension to an unknown depth during flood.

The route of the pipeline on the camp side of the crossing was, for a short distance, through cultivated land on the Fort Roots Hospital reservation and, for the balance of the route, was through rocky and rolling ground covered for the most part with a hard wood second growth.

## Design Features

Surges and pulsations to be expected in the line were studied. The static pressure on the line at the river crossing, the low point in the line, was 440 ft., or 191 psi. Maximum working pressure on the line for a flow of 3 mgd. was 110 psi. at the plant and 215 psi. in the valley below the treatment plant, based on a value for $C$ of 130.

In studying pressure surges, the critical time cycle was calculated to be 13 sec., and since the rapid closure of a valve within this time might cause severe pressure waves, a time of closure of 30 sec. was specified on the camp control valves. In the camp end of the line, it was expected that the distribution system grid would serve to dampen pressure waves. However, at the treatment plant it was considered advisable to provide surge relief valves. Plant piping was, in part, 125-lb. class pipe and fittings and the relief valves were set to protect this piping at a pressure of 140 psi.

Due to the head available, it would have been possible to lose water through the line at a rate of about 7,000 gpm., if a break had occurred at the river crossing with a full standpipe at the camp. To protect the storage at the camp, in a 2.5-mil.gal. standpipe and in the camp grid, it was necessary to provide an automatic check valve, installed at the end of the supply line where it entered the camp distribution system. A cone-type check valve was installed, so designed that it closed automatically if the direction of flow in the line reversed.

Air valves were specified for all high points in the line. Vacuum relief valves were provided at each end of the line, the ends being the high points, to protect the line against collapse in case of line failure due to a break at a lower point. Valves and fittings in the supply line between the filter plant and Camp Robinson were 250-lb. working pressure.

A study of pumping equipment indicated that additional pumping capacity was required at the city treatment plant pumping station. With the addition of another pumping unit it was possible to provide for a design capacity of 3 mgd. With the camp design based, at that time, on a military population of 25,000, this supply line capacity was considered ample and amounted to 120 gpd. per capita. It was anticipated that if the camp were expanded in the future (as proved to be the case) it would be possible to provide additional pipeline capacity by the use of booster pumps.

Specifications required an 18-in. cover for the pipeline as a protection against disturbance and crushing loads.

Grades were calculated and shown on the plans for all break-points, based on lengths of pipe of 40 ft. Pipe when delivered was random length averaging 43 ft. in length and it was necessary to refigure all grades in the field. However, plan grades defined requirements and served to locate fittings and valves.

## Construction Items

Construction of the supply line was started on Sept. 28, 1940, and was completed Dec. 19, 1940, a total elapsed construction period of 83 days.

Due to the requirements of alignment and profile, various fitting bends were ordered. These fittings were authorized for bids on September 20 but no proposals were received. The pipe supplier later arranged to furnish the fittings. The first shipment of pipe arrived September 28. However, no fittings were received until December when all pipe, except 1,000 ft., had been laid. As a result of lack of fittings, it was necessary to cold-cut the forty-odd-foot lengths of pipe into 10- and 20-ft. lengths in order to construct curves and bends without fittings. The pipe, as delivered, ranged from 31 ft. to 46 ft. in length. Such lengths, which usually are advantageous, proved difficult for construction in this rolling country with as much rock trench excavation as was required on this job. However, if fittings had been available it would have been practical to lay long lengths with the use of a few shorter lengths. The great demand for steel pipe at the time necessitated the use of the double random lengths in order to improve output from the steel mills manufacturing facilities. This same factor dictated the use of $\frac{3}{8}$-in. wall steel pipe, whereas some reduction in wall thickness would have answered the service requirements.

The work was constructed under a subcontract to a prime contract, both of which were on a fixed-fee basis. At the beginning of construction the contractor had planned to start two laying crews at the river, one to work south toward the filter plant and the other to work north toward Camp Robinson.

However, due to the wartime slow delivery of the steel pipe this plan was discarded and one crew only started September 28 at the left bank of the river, to work toward Camp Robinson.

One crew cleared the line and also rough-graded a suitable trail for the wagon drills and trench hoes to follow. This crew was followed by wagon drills and powder crews who shot and loosened the rock so that it could be handled by trench hoes.

It developed that over 50 per cent of the trench required rock excavation. On the line north of the river 12,500 ft. of a total of 15,000 ft. required shooting of rock. Where rock was encountered excavation was carried below the grade line and sand or dirt was hauled in to serve as a pipe bedding.

Sand or earth was also used to fill around the pipe to a point 6 in. above the top of the pipe, to cushion the exterior coating from damage by contact with rock in the backfill material.

Fill material was hauled from pits near the river, the closest source. The steel pipe wrapping was in good condition on delivery and after the contractor set up proper methods of handling, the pipe was placed in the trench with practically no damage to the wrapping. Where damage did occur, care was exercised to insure replacement of the protection.

Pipe was strung out along the line as fast as it was received. The pipe-laying crew consisted of a maximum of 60 men and a trench hoe or crane to handle the pipe into the trench. Although the curves and changes in grade were laid out well in advance of the laying and the deflection per joint was held to approximately one-half of the maximum recommended deflection of 4 deg., there was no way to determine the exact location of each coupling due to the random lengths, and also due to deliveries not keeping up with trenching operations. For this reason it was necessary to change many of the curves by hand labor, when the pipe was ready to lay. Where the trench was excavated in loose material, this was not troublesome, but in rock sections much time was spent in preparing the trench for the revised random lengths. Due to slow delivery of fittings it was necessary to cut the pipe into shorter lengths in order to avoid excessive hand trenching in rock.

The contractor's pipe-laying crew was well organized from the start of the work and few changes were made in personnel. Pipe was laid by grade boards placed at each bell hole and the trench was fine-graded by hand to conform to this grade. Particular care was taken in the making of joints. Couplings were covered with protective coating material furnished by the manufacturer.

Other than the usual difficulties in laying a pipeline of this character, the one that caused the most delay and lost time was the delay in delivery of pipe and fittings.

The field construction work was executed by the contractor in a highly satisfactory manner. Of the 83 days required for construction, 49 days were lost on account of lack of pipe or fittings. Two days were taken off for Sunday and four days were lost on account of rain, which left 28 full working days for pipe installation, and the average rate of installation was 1,000 ft. per working day.

## River Crossing

The crossing of the Arkansas River with the two 12-in. cast-iron lines presented the most difficult problems in the construction of the water supply line.

At the east bank it was necessary to shoot out some of the irregular rock ledges to give support for the cast-iron pipe, in such a way as to keep the angular change per joint at less than the maximum allowable. Three feet of cover over the pipe in the river bed was required.

Because of the scarcity of dredging equipment and the difficulty of coping with river current conditions, jetting equipment was used to place the pipe at the desired depth in the river bed. After several trials, a jetting header with multiple 2-in. jets was used. The header totalled 60 ft. in length and enough flow was obtained to agitate the

river bed to a state of suspension below the pipe which then could be lowered into the river bed.

Actual construction of the crossing started with the trenching in the left bank, for the downstream line, on October 17. A few joints failed at first, due to the inexperience of workmen tightening the joints. The pipe was tested in three-length units at a pressure of 500 psi. for a period of 5 min.

There were some failures due to cracked ball portions of the joints which were discovered in testing.

The downstream crossing was completed on November 18, 32 days after the start, with an average rate of 44 ft. per day. The upstream crossing was started on November 23 and was completed December 3 at an average laying rate of more than 150 ft. per day. On both crossings the contractor's force worked a 24-hr. day.

### Results in Service

After the entire line had been in operation for over a month, only one joint in the steel pipe was found to be leaking and this was stopped by retightening the joint.

The downstream crossing was broken in the flood of May 1943. It was then learned that the flood had washed away the softer surrounding material in the bank, exposing a rock ledge or fin that the original soundings had bracketed. The pipe was suspended on this rock fin and one joint was broken. In addition to breaking the downstream line, the flood left a portion of the upstream line suspended in mid-air near the right bank. The line held, however, and the camp was supplied with the one 12-in. crossing line until repairs to the broken line could be accomplished.

Following the completion of the line, Camp Robinson was later expanded to include a total population of 47,000 and the water demands of the camp were increased to an extent requiring the construction of a booster pump station. This station was constructed near the south border of the camp, and increased the capacity of the line to 6 mgd.

Recent tests made by the War Department through the Corps of Engineers indicate a $C$ value for the overall line, after 3 years of service, of 130.

# Chlorination Practices at Four Southern Indiana Water Purification Plants

*By C. D. Adams*

*Discussions by Louis J. Alexander and A. E. Griffin*

CHLORINE treatment of public water supplies has developed through three stages. The first continues from its inception until early in 1940 when the break-point phenomenon was first observed and recognized as such. The second covers from 1940 until late in 1943. The third stage started late in 1943 and is now continuing.

During the *first* period, chlorination was controlled by the maintenance of residuals determined by the amount of color present at the end of 5 min. or more after the addition of ortho-tolidine. The desired residual varied according to location and according to regulations set up by the various state health departments. In most cases they ranged from 0.1 to 0.3 ppm.

The *second* is recognized as a period of transition from the marginal to the break-point method of chlorination. Throughout this time the control of the process was based on the sudden appearance of color following a quick addition of ortho-tolidine. Other methods of control were developed. Included in these are the Laux-Nickel Neutral Ortho-tolidine Test (1) and the Moore Test which utilizes *p*-amino-dimethylaniline (2). The residuals maintained varied over a wide range up to and in some cases above 2.0 ppm., according to the individual ideas of the operator. As data were accumulated it became evident that the results obtained were not constant and that the control of the process was in need of standardization.

The *third* period was established when knowledge was developed that the true break-point was reached only when the immediate or "flash" color, which indicates the presence of free chlorine, amounted to from 85 to 100 per cent of the color at the end of 5 min. (3). This defined the meaning of the true break-point residual, and thereby established the much needed "break-point flash" test.

It is the main purpose of this paper to consider these three periods and to show the results obtained in each at four southern Indiana water purification plants.

The plants under consideration are all small. They range in capacity from 0.5 to 4.0 mgd. All but one of them are operated intermittently.

One plant is equipped with full laboratory facilities and is operating under

A paper presented on June 13, 1944, at the Milwaukee Conference by C. D. Adams, Water Plants Supt., Public Service Co. of Indiana, New Albany, Ind.

technical supervision. All of the others possess limited laboratories, devoted to such simple tests as residual chlorine, turbidity, pH and alkalinity and are operated remotely under the same supervision as the first. At each plant only one operator is on duty during each shift. All of these operators are "trained-in-the-field" men. In general, it is presumed that these men and plants are representative of the majority of plants of similar size throughout the country.

This review of operating procedures and analysis of details has been of great value to those in charge of the plants in that it has focused attention on certain inadequacies of operation and design, the correction of which has been of much benefit even in those places where no major change in treatment has been instituted, and which otherwise would probably have gone unnoticed due to the fact that the overall picture of several years' operation brings out in contrast those things which are hidden in a weekly or monthly consideration of the same. The contained data were compiled directly from plant records.

Data of 7¾ years' operation are offered. This particular span of time was chosen in order to make a comparison of an equivalent number of years before and after the change from marginal break-point chlorination was effected. Throughout this period the major change in treatment at each plant for the most part has been in the amount of chlorine used. Very few changes have been made in the use of chemicals other than those necessary to meet normal stream conditions. In one case deliberate changes were made for experimental purposes. In general, the amount of chlorine used has increased considerably, while the amounts of the other chemicals used have been affected very little. The increase in chlorine has been due partly to increased pollution in the streams and partly to the change from marginal to break-point treatment.

There have been periods at each plant during which the chlorine requirements for the desired residual have exceeded installed chlorinator capacity, and these periods have left their effects upon the results obtained. In some instances these deficiencies have been remedied while in others corrective measures are under way.

The benefits derived from all the changes made have been measured principally by the reduction in the percentage of 10-ml. lactose broth tubes showing the presence of the non-confirming gas-producing organisms in the finished water. This yardstick was chosen for the purpose of demonstrating the practicability of producing water, essentially free of such organisms, from a variety of sources. The coliform index was not used because of their general absence from the waters under consideration. The results in all cases have far exceeded the accepted bacterial standards of drinking water quality. In fact, the application of the new method of control of the break-point process has demonstrated that the gas-producing organisms are eliminated by the treatment. This fits in with the opinion of Baylis who, in 1940, expressed the belief that it should be possible to eliminate all gas-forming bacteria from water (4). The results herein presented show that this can be done even in a highly polluted stream such as the Ohio River.

The problems encountered at each of the plants, while not reaching the extremes of the ones at Ottumwa (5) and Anderson (6), are nevertheless

quite typical of those usually encountered throughout the central part of the country. Two plants take water from the Ohio River, while the other two take from the East Fork of the White River. The pollution factor of the Ohio River is well known by virtue of the published surveys. It is perhaps sufficient to state that, during any one year, it will run the gamut of problems from the cold, turbid water of winter to the warm, slowly moving organic laden stream of summer. The quality of water in the East Fork of the White River presents a similar series of problems, but of lesser intensity.

Operational data, relating particularly to the bacterial results during the period concerned, are shown on Figs. 1 to 4 inclusive. In their interpretation it is necessary to keep in mind the following facts:

1. Chlorine treatment was handicapped because the machines were specified and installed for marginal rather than for break-point chlorination.

2. The chlorine dosages presented are based upon the total pounds of chlorine used per month in respect to the total number of million gallons of water treated during the month. This erases any wide variations in daily chlorine consumption and thereby fails to disclose possible reasons for fluctuations in the percentage of gas producers found in the finished water.

3. All cost data are based upon chemical costs at Plant B. Cost figures for the other plants are thus not exact, but it is possible to use them for comparative purposes.

4. Bacteriological samples from Plant B were planted shortly after collection. All other bacteriological samples were shipped to the central laboratory via U.S. mail. The time in transit varied from 7 to 24 hr.

5. Prior to July 1943, identification was made according to the "presumptive" test for organisms of the coliform group, as described in the 7th Edition of *Standard Methods*. Since that time, confirmation has been carried out by means of the B.G.B. method. This is in accordance with the standard procedure of the Indiana State Board of Health.

6. The 3½-year period ending December 31, 1943, must be considered a period of transition during which the control has undergone refinement as knowledge of the process has been revealed and disseminated by laboratory research and field practice.

7. 1944 cost data are not complete and deal with the year's most turbid water; these factors should be given consideration if the data are used for comparative purposes.

## Plant A

| | |
|---|---|
| Source of water | Ohio River |
| Daily output | 0.3—0.5 mgd. |
| Operation | Intermittent |
| Treatment | Pre-chlorination |
| | Coagulation with alum |
| | Lime for pH control |
| | Activated carbon |
| | Filtration |
| | Post-chlorination |

Five distinct periods or cycles of operation are shown in Fig. 1. (1) Mid-year 1937 to mid-year 1939; (2) Mid-year 1939 to Sept. 1, 1940; (3) Sept. 1, 1940, to Nov. 1, 1942; (4) Nov. 1, 1942, to Dec. 31, 1943; and (5) Dec. 31, 1943, to April 30, 1944.

Period 1 is characterized by a high incidence of gas formers, during which the percentage of tubes showing gas never dropped below 10 per cent. In Period 2 a general improvement of operational methods brought the index down to the 10-per cent range. In Period 3 the application of chlorine

TABLE 1

*Operational Data—Plant A*
*Annual Average Chemical Treatment Cost and Bacteriological Data*

| Year | Turbidity | Alum | Lime | Carbon | Chlorine | Total | 10-ml. Lactose Broth Tubes | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Planted | Positive | Positive—% |
| 1937 | 325 | $1.87 | $0.46 | $3.24 | $0.67 | $ 6.24 | 1065 | 326 | 30.6 |
| 1938 | 391 | 2.16 | 0.78 | 4.12 | 0.77 | 7.83 | 1535 | 469 | 30.6 |
| 1939 | 330 | 2.15 | 0.68 | 4.87 | 0.78 | 8.48 | 1480 | 371 | 25.1 |
| 1940 | 347 | 1.72 | 0.66 | 5.45 | 0.75 | 8.58 | 1510 | 173 | 11.5 |
| 1941 | 258 | 1.54 | 0.75 | 6.82 | 1.49 | 10.60 | 1510 | 90 | 6.0 |
| 1942 | 462 | 2.60 | 1.10 | 8.05 | 2.31 | 14.06 | 1470 | 124 | 8.4 |
| 1943 | 342 | 1.89 | 0.88 | 6.93 | 2.20 | 11.90 | 1355 | 328 | 24.2 |
| To April 1944 | 333 | 5.44 | 1.50 | 3.06 | 4.25 | 14.25 | 480 | 50 | 10.4 |

was gradually raised in an attempt to reach break-point proportions. During this period, although sufficient chlorine was added to remove the greater amount of free ammonia present, sufficient excess was seldom attained to remove completely the gas-forming organisms. In spite of this a very creditable record was obtained, for, with two exceptions, the gas-forming bacteria were kept below 10 per cent, and averaged about 5 per cent.

Of all the gas formers that did show up, 50 per cent appeared in the samples collected on Thursdays. To this day this phenomenon remains unexplained. The operating records have been repeatedly searched and the personnel has been questioned, but to no avail. Had these samples been eliminated, or had the Thursday samples failed to arrive, the results obtained during this period would have been very outstanding. As it is, the record is considered to be very good for it has been a general belief that the gas-forming bacteria are very difficult to eliminate from surface water.

The rise in the chemical costs parallels, in a way, the increase in war production upstream, but the cost of carbon treatment during the 7-year period increased $4.81 per mil.gal. while the cost of the chlorine treatment rose only $1.64 (see Table 1). The latter figure would have been approximately doubled during 1943 if break-point treatment had been maintained.

Two factors probably contributed to the increase of gas producers during 1943. One was the inability to maintain break-point treatment; the other was the need of repairs to the filter underdrains. (Both of these were corrected in January 1944, and the elimination of the gas producers and of the tastes and odors in the plant effluent have resulted.)

The amounts of chlorine applied and the residuals maintained during these periods are shown in Table 2.

TABLE 2

*Chlorination Data —Plant A —ppm.*

| Period No. | Maximum | Minimum | Average | Average Residual |
|---|---|---|---|---|
| 1 | 1.84 | 1.20 | 1.64 | 0.39 |
| 2 | 1.80 | 1.40 | 1.60 | 0.40 |
| 3 | 5.51 | 1.72 | 3.81 | 0.50 |
| 4 | 5.62 | 4.10 | 4.85 | 0.54 |
| 5 | 10.90 | 8.25 | 9.15 | 0.99 |

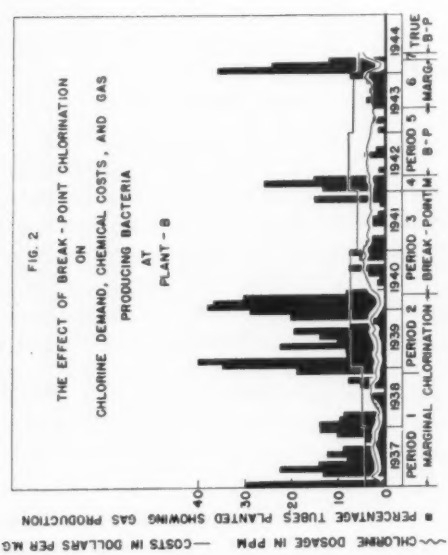
FIG. 2
THE EFFECT OF BREAK-POINT CHLORINATION
ON
CHLORINE DEMAND, CHEMICAL COSTS, AND GAS
PRODUCING BACTERIA
AT
PLANT - B
CHLORINE DOSAGE IN PPM — COSTS IN DOLLARS PER M.G.
PERCENTAGE TUBES PLANTED SHOWING GAS PRODUCTION
1937 1938 1939 1940 1941 1942 1943 1944
PERIOD 1 PERIOD 2 PERIOD 3 PERIOD 4 PERIOD 5 PERIOD 6
MARGINAL CHLORINATION — BREAK-POINT — MARG. — B-P — TRUE B-P

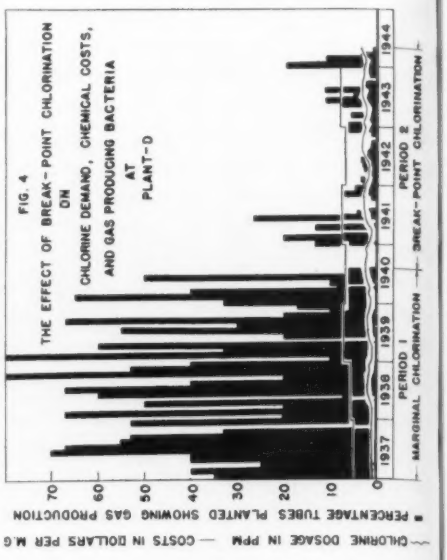
FIG. 4
THE EFFECT OF BREAK-POINT CHLORINATION
ON
CHLORINE DEMAND, CHEMICAL COSTS,
AND GAS PRODUCING BACTERIA
AT
PLANT - D
CHLORINE DOSAGE IN PPM — COSTS IN DOLLARS PER M.G.
PERCENTAGE TUBES PLANTED SHOWING GAS PRODUCTION
1937 1938 1939 1940 1941 1942 1943 1944
PERIOD 1 PERIOD 2
MARGINAL CHLORINATION — BREAK-POINT CHLORINATION

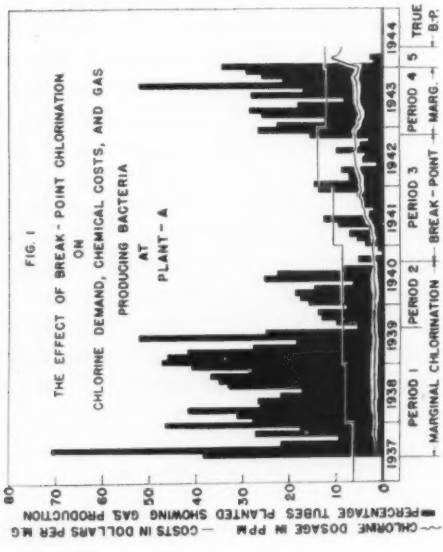
FIG. 1
THE EFFECT OF BREAK-POINT CHLORINATION
ON
CHLORINE DEMAND, CHEMICAL COSTS, AND GAS
PRODUCING BACTERIA
AT
PLANT - A
CHLORINE DOSAGE IN PPM — COSTS IN DOLLARS PER M.G.
PERCENTAGE TUBES PLANTED SHOWING GAS PRODUCTION
1937 1938 1939 1940 1941 1942 1943 1944
PERIOD 1 PERIOD 2 PERIOD 3 PERIOD 4 PERIOD 5
MARGINAL CHLORINATION — BREAK-POINT — MARG. — B-P — TRUE B-P

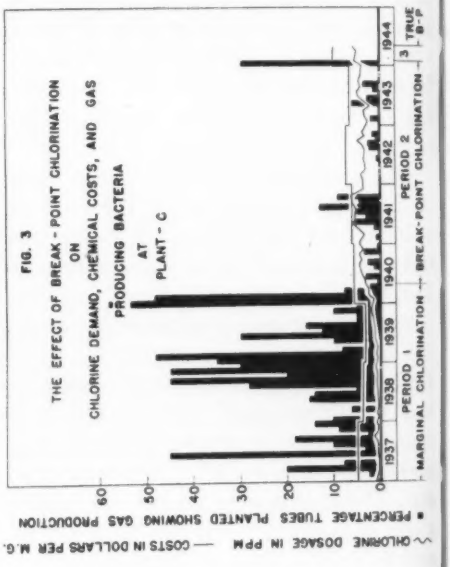
FIG. 3
THE EFFECT OF BREAK-POINT CHLORINATION
ON
CHLORINE DEMAND, CHEMICAL COSTS, AND GAS
PRODUCING BACTERIA
AT
PLANT - C
CHLORINE DOSAGE IN PPM — COSTS IN DOLLARS PER M.G.
PERCENTAGE TUBES PLANTED SHOWING GAS PRODUCTION
1937 1938 1939 1940 1941 1942 1943 1944
PERIOD 1 PERIOD 2
MARGINAL CHLORINATION — BREAK-POINT CHLORINATION — TRUE B-P

FIGS. 1-4. Charts Showing Break-Point Chlorination at the Four Plants

*Summary*

It is sufficient to point out, as shown in Fig. 1, that the following is evident:

1. During Period 3, the time during which the addition of chlorine was controlled by the production of a flash of color upon the addition of ortho-tolidine, the concentration of gas-forming bacteria reached a minimum.

2. When marginal chlorination (Period 4) was reverted to, the bacteria returned, but they disappeared completely when chlorination (Period 5) was added according to the latest ideas of control, namely, the production of full color immediately following the addition of ortho-tolidine.

3. The increase in the total chemical costs has been due more to the increased pollution in the raw water than to the cost of the increased chlorine dosage.

## Plant B

| | |
|---|---|
| Source of water | Ohio River |
| Capacity | 4.0 mgd. |
| Operation | Continuous |
| Treatment | Pre-settling—10 days retention |
| | Pre-chlorination—entrance to mixing basin |
| | Coagulation with alum |
| | Activated carbon for "black out" purposes |
| | Lime for pH control |
| | Filtration |
| | Post-chlorination—filter effluent |

In general the bacteriological record at this plant has been good. The results obtained in each of seven periods indicated by the statistics in Fig. 2 merit separate discussions.

*Period 1 (Jan. 1, 1937–Nov. 31, 1938).* It was during this time that the 1937 Ohio River flood occurred. High residuals (12.0 ppm.) were maintained in the plant effluent and the distribution system throughout February of that year. This demonstrated the fact that the gas-producing organisms could be controlled, but the residual chlorine content carried was so high that the true significance of the break-point treatment was obscured. However, by maintaining residual chlorine varying from 0.30 to 0.40 ppm. in the plant effluent, the number of gas producers was kept at a very low level during the remainder of this period. It is of some interest to note that in order to maintain the desired residual more chlorine was required during the summer than during the winter months. This phenomenon is a function of the taste vs. temperature relationship common to marginally chlorinated water.

*Period 2 (Dec. 1, 1938–March 31, 1940).* Due to changing river conditions, the gas-producing organism content gradually rose to an approximate average of 20 per cent, with a peak of nearly 40 per cent. Regardless of this, the chlorine dosages remained low. This was largely due to the phenomenon mentioned above—the fact that, whenever enough chlorine was added for good bacterial elimination, tastes developed, and that, when the dosage was lowered to satisfy the taste requirements, the desired removal of the gas-producing organisms was not obtained. This is a splendid example of marginal chlorination.

*Period 3 (April 1, 1940–Dec. 31, 1941).* Break-point chlorination's greatest value lies in its ability to remove bacteria. When this can be accomplished and tastes and odors can be removed at the same time, the conditions might be described as ideal. For a short time following the start of break-point chlorination in April 1940 this ideal was realized—all bacteria and tastes were removed. Unfortu-

nately, however, it was not always possible to achieve these results consistently. This was probably due, in a large degree, to the lack of a reliable control test. However, throughout this period, the gas-forming bacteria remained at a low level and chemical costs were reduced to some extent.

The high bacterial content of November 1941 was due to occasional rises in the turbidity of the finished water to over 0.3 ppm., combined with the misconception that the flash of color was the control point for the break-point treatment.

*Period 4 (Jan. 1, 1942–March 31, 1942).* The high bacterial results during this period were undoubtedly caused by the use of ammonia in an experimental test concerning the control of tuberculation within the distribution system. This confirms results obtained elsewhere which disclose that relatively large numbers of gas-forming bacteria can exist in substantial amounts of chlorine residual.

*Period 5 (April 1, 1942–May 31, 1943).* During this period the bacteria were held in check very well even though break-point chlorination was maintained only by virtue of the control tests in which the flash of color was employed as the deciding factor.

*Period 6 (June 1, 1943–March 19, 1944).* This was a period of definite marginal chlorination brought about by a multiplicity of factors including a higher chlorine demand accompanied by an increase in the pumping rate.

*Period 7 (March 20, 1944–April 30, 1944).* This period demonstrates what can be expected from water in which the break-point is controlled by the latest test method. Note the absence of gas-producing organisms over the entire, though short, period.

Table 3 shows the data pertaining to marginal and break-point treatment periods.

TABLE 3

*Chlorination Data—Plant B*

| | *Chlorine Added—ppm.* | *Chlorine Residual Finished Water (Lab. Tap)—ppm.* |
|---|---|---|
| Marginal | 1.71 | 0.32 |
| Break-point | 3.08 | 0.42 |

TABLE 4

*Operational Data—Plant B*

*Annual Average Chemical Treatment Costs and Bacteriological Data*

| Year | Turbidity | Alum | Lime | Calgon | Ammonium Sulfate | Copper Sulfate | Carbon | Chlorine | Total | 10-ml. Lactose Broth Tubes | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Planted | Positive | Positive—% |
| 1937 | 176 | $2.33 | $0.10 | | | $0.05 | $0.80 | $0.78 | $4.06 | 1780 | 199 | 11.2 |
| 1938 | 151 | 2.62 | 0.15 | | | 0.21 | 1.09 | 0.75 | 4.82 | 1855 | 114 | 6.2 |
| 1939 | 191 | 4.05 | 0.41 | | | 0.09 | 1.86 | 0.76 | 7.17 | 1820 | 318 | 17.5 |
| 1940 | 124 | 3.20 | 1.22 | | | 0.18 | 1.16 | 1.30 | 7.06 | 1820 | 205 | 11.3 |
| 1941 | 69 | 2.13 | 1.23 | | | 0.08 | 0.78 | 1.31 | 5.13 | 1850 | 53 | 2.9 |
| 1942 | 160 | 3.06 | 0.83 | $1.76 | $0.07 | 0.13 | 0.39 | 1.51 | 7.75 | 1750 | 92 | 5.3 |
| 1943 | 202 | 2.47 | 0.21 | 1.65 | | 0.10 | 0.85 | 1.17 | 6.45 | 1820 | 40 | 2.2 |
| To April 1944 | 104 | 2.73 | 0.93 | | | 0 | 0.81 | 1.35 | 5.82 | 1085 | 188 | 17.3 |

*Analysis of Chemical Data*

Yearly changes in total chemical costs at this plant cannot be definitely attributed to any one factor, but appear to be the result of a multitude of influences including changes in design, variations in raw water characteristics and the carrying on of experimental work. For instance, during 1942, alum was used in greater quantities than the year previous due to an increase in the turbidity of the river water. This resulted in an increase of $1.46 per mil. gal. of water treated. The costs in 1943 were somewhat less due to a lower use of alum because of improvements in the settling basins. This occurred while the average turbidity of the raw water increased 42 ppm. over 1942 (see Table 4).

In conclusion, it can be seen that the control of gas-producing organisms at this plant, though not by any means perfect, has been good. This fact becomes more impressive when it is remembered that of the 7,675 tubes planted since April 1940, only 880 have shown gas, and of that number, 420 were from marginally chlorinated water.

**Plant C**

| | |
|---|---|
| Source of water | East Fork of the White River |
| Capacity | 1.5 mgd. |
| Operation | Intermittent |
| Treatment | Pre-chlorination<br>Coagulation with alum and lime<br>Carbon occasionally added to the settling basin for "black-out" purposes<br>Filtration<br>Post-chlorination |

The bacteriological picture of the finished water at this plant is thrown into sharp relief in Fig. 3. From Jan. 1, 1937, to May 1, 1940 (Period 1), the percentage of gas formers rose and fell without pattern, not even fluctuating with the seasons. During this time the average number of tubes showing gas was 18.2 per cent. Since May 1, 1940, however, with the exception of a short period during the summer and fall of 1941, their numbers have been consistently low, averaging 1.6 per cent. This represents a 91 per cent reduction by break-point treatment. The rise in 1941 was due to a very low stage of the river. During this period the pollutional load became very heavy and chlorinating capacity became taxed. Severe tastes and odors were present in the raw water, but they were, for the most part, controlled in the finished product. In 1942 and 1943 neither tastes nor odors appeared that break-point treatment failed to control.

The recurrence of gas formers in January 1944 was due to the inexperience of new operators in handling extreme changes in turbidity of the raw water. Since that time not a single gas producer has been evident.

The chlorine dosages at this plant have risen from an average of 0.79 ppm. to an average of 3.56 ppm. Although the percentage rise might be considered high, the actual increase is not great when compared with a rise of 10 and 15 ppm. at other plants in the state.

The inadequacy of marginal chlorination is demonstrated by the fact that, during the period of its use at this plant, the dosage of 6.79 ppm. gave an average residual of 0.40 ppm., while during the time of break-point chlorination the dosage of 3.20 ppm. gave an average residual of 0.52 ppm. Thus, the difference between an average demand of 0.29 ppm. and 3.04 ppm. indicates that the increased chlorine is

performing work instead of being wasted.

Table 5 shows the variation in chlorine demand under the two forms of treatment.

TABLE 5

*Chlorination Data—Plant C*

| | *Marginal ppm.* | *Break-Point ppm.* |
|---|---|---|
| Maximum | 3.20 | 5.94 |
| Minimum | 0.34 | 1.83 |
| Average | 0.79 | 3.56 |

The treatment costs at this plant are of considerable importance. From 1937 to 1940 they averaged $3.68 per mil.gal. of water treated. Since that time, and this includes the period of break-point treatment, they have risen to an average of $6.12. See Table 6. This is an increase of 66 per cent. It has been due not only to the use of 350 per cent more chlorine, but to additional factors, including unprecedented variations in stream flow and changes in supervision and plant design. The effect that the progress from marginal to break-point treatment has had upon the total cost figure is not readily discernible. However, in view of the facts that tastes and odors have been satisfactoritly controlled throughout the entire period, and that water of a far superior bacteriological quality to that of the previous period was produced by the newer method, the management of this plant should, and undoubtedly does, feel that it has received ample value from the increase in production costs.

To summarize the results at Plant C: break-point treatment has demanded the use of much more chlorine; total costs of treatment have increased, though this has not been entirely due to additional chlorine; tastes and odors have been controlled; and a good bacteriological quality of the finished water has been maintained. There have been a few instances when marginal chlorination was practiced. The most important of these occurred during the last period, which was in 1944. The use of the new break-point flash control test should eliminate any further lapses into this type of chlorination because, with its use, much is being learned about the real value of the break-point treatment and it is anticipated that future extremes in chlorine

TABLE 6

*Operational Data—Plant C*
*Annual Average Chemical Treatment Costs and Bacteriological Data*

| Year | Turbidity | Alum | Lime | Carbon | Ammonium Sulfate | Chlorine | Total | 10-ml. Lactose Broth Tubes | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Planted | Positive | Positive—% |
| 1937 | | $3.79 | | | | $0.30 | $4.09 | 485 | 57 | 11.8 |
| 1938 | | 3.30 | | $0.08 | | 0.35 | 3.73 | 510 | 92 | 18.0 |
| 1939 | | 2.49 | | 0.08 | | 0.64 | 3.21 | 520 | 79 | 15.2 |
| 1940 | | 3.58 | | 0.33 | $0.09 | 1.58 | 5.58 | 1750 | 108 | 6.2 |
| 1941 | | 3.10 | | 0.61 | 0.02 | 2.14 | 5.87 | 1790 | 61 | 3.4 |
| 1942 | 272 | 5.28 | | 0.11 | | 1.55 | 6.94 | 1785 | 11 | 0.6 |
| 1943 | 255 | 4.48 | | | | 1.61 | 6.09 | 1915 | 19 | 1.0 |
| To April 1944 | 173 | 7.22 | | | | 2.35 | 9.57 | 815 | 56 | 6.9 |

demands of the water will be more than matched by increased chlorinating capacities.

## Plant D

| | |
|---|---|
| Source of water | East Fork of the White River, approximately 35 mi. below Plant C |
| Capacity | 3.0 mgd. |
| Operation | Intermittent |
| Treatment | Pre-chlorination<br>Coagulation with alum and lime<br>Activated carbon<br>Copper sulfate to hold algae in check in settling basin and on filters<br>Filtration<br>Post-chlorination |

The transitional period from marginal to break-point chlorination has been characterized in certain places by a few factors which, when merged, make up a condition which gives results that possess the general appearance of ineffectiveness, but which, when analyzed in detail, must be designated as good. Plant D, as shown in Fig. 4, is one of those plants where such conditions existed. In general, the factors were: (1) a lack of full understanding of the control of the process, which resulted in the use of a flash of color upon the addition of ortho-tolidine as the control point; (2) a hesitancy to grasp the full importance of the treatment and to weigh it properly against the resulting costs, which delayed full use of it; and (3) a definite lack of chlorinating capacity for the increased chlorine demand, which defeated the best intent of those concerned with the operation of the plant. Such factors are common to any change and should not be considered detrimental to the process involved, for their correction follows a general pattern in any normal progress. At this plant the first factor has been corrected by the improved control test, the second one has been erased by the results obtained even though it has been impossible to attain the desired goal, and the third one is in the process of elimination by the installation of additional chlorinating capacity.

The results obtained clearly demonstrate the transitional period. Prior to August 1940 the chlorine dosages varied from a minimum of 0.3 ppm. to 2.1 ppm., averaging 1.06 ppm. The percentage of gas formers fluctuated in a like manner, going from 0 on four occasions to as high as 80 per cent while averaging 41.5 per cent of the total planted. The fact that gas producers were absent during four of the 43 months indicates that break-point treatment had been reached at this plant even prior to the time the process was placed upon a formal basis. The new process, as the figure shows, was started in July 1940. The remaining time makes up the transitional period. That difficulty has been encountered is clear, yet the fact remains that, even though the ultimate results were not obtained throughout the period, the reduction in gas formers from an average of 41.5 per cent during marginal chlorination to an average of 3.2 per cent during the transitional period and a fair control of taste and odors at the plant must be classed as good results. Table 7 shows amounts of chlorine used before and after break-point treatment.

TABLE 7

*Chlorination Data—Plant D*

| | *Prior to Aug. 1940 ppm.* | *Subsequent to Aug. 1940 ppm.* |
|---|---|---|
| Maximum | 2.1 | 3.2 |
| Minimum | 0.3 | 0.7 |
| Average | 1.06 | 2.03 |

TABLE 8

*Operational Data—Plant D*
*Annual Average Chemical Treatment Costs and Bacteriological Data*

| Year | Turbidity | Alum | Lime | Carbon | Copper Sulfate | Chlorine | Total | 10-ml. Lactose Broth Tube | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Planted | Positive | Positive—% |
| 1937 | 208 | $4.87 | | | | $0.34 | $5.21 | 205 | 85 | 41.6 |
| 1938 | 153 | 3.34 | $0.25 | $0.71 | $0.64 | 0.57 | 5.51 | 150 | 69 | 46.0 |
| 1939 | 198 | 4.46 | 0.34 | 0.97 | 0.79 | 0.56 | 7.11 | 175 | 62 | 35.4 |
| 1940 | 135 | 3.44 | 0.25 | 1.42 | 0.83 | 0.75 | 6.69 | 110 | 29 | 26.4 |
| 1941 | 145 | 3.84 | 0.30 | 1.46 | 0.93 | 0.88 | 7.41 | 1025 | 60 | 5.8 |
| 1942 | 244 | 3.80 | 0.44 | 1.06 | 0.42 | 1.05 | 6.77 | 1750 | 40 | 2.3 |
| 1943 | 255 | 5.13 | 0.67 | 0.71 | 0.20 | 1.12 | 7.83 | 1910 | 89 | 4.7 |
| To April 1944 | | 8.14 | 1.14 | 0.72 | 0.11 | 1.28 | 11.39 | 620 | 51 | 8.2 |

An analysis of the cost of chemical treatment figures of this plant reveals, as it has done at the others under consideration, that no definite statement can be made as to whether break-point treatment has brought about a savings or an increase in the total unit figure (see Table 8). Many factors have had various effects, the net result being a fluctuation in the cost which roughly parallels the changes in the annual average turbidity of the raw water. It is believed, however, that when the necessary additional chlorination capacity is installed, changes in the present use of chemicals can be made which should show some savings even though there is to be an increase in chlorine consumption.

## Conclusion

This discussion of operational data from four plants over a period of 7½ years covers the three phases through which the practice of chlorination of public water supplies has developed. It is presumed that the data presented are typical of other plants of similar design and operation throughout the country.

The over-all picture of the bacteriological results obtained demonstrates the fact that by the use of the new control test (in which the immediate or "flash" color upon the addition of ortho-tolidine is 85 to 100 per cent of the color at the end of 5 min.) the gas-producing organisms can be eliminated as long as the turbidity of the finished water is kept below 0.3 ppm.

When decisions are to be made regarding whether or not to employ break-point chlorination at any plant, special attention should be paid to the fact that during the time since the prenomenon was recognized and up to late in 1943 the process was passing through a transitional period; and that 1944 data present the truest results.

No definite statement can be made as to whether or not break-point chlorination increased treatment costs at the four plants. Since the advent of the break-point flash control test late in 1943, evidence seems to indicate that a saving in cost can be made. It goes without saying that more chlorine will be needed for the process, but even then it might be possible to create

savings through the medium of differences in containers for the gas. Such plans are being made at Plant B.

When break-point treatment is to be used as one of the tools for the removal of tastes and odors, special effort should be made to maintain 100 per cent of *free (not chloramine)* chlorine at all times in the plant effluent. Best results will be obtained if this amount of free chlorine is present ahead of the filters.

This discussion has pointed out the fact that the gas-producing organisms can be controlled by break-point treatment and that, when results concerning them are not up to expectations, other factors such as insufficient coagulation, resulting poor filtration and conditions in the filters should be investigated. This policy was followed at Plant A early in 1944 and the repaired filters have had their effects in the recent very good results obtained there.

The use of the new break-point flash control test for break-point chlorination necessitates a revision of the concept related to maintenance of chlorine residuals. This is evidenced by the fact that at Plants D, C and A the chlorine residuals under the new control are 0.45, 0.75 and 0.80 ppm., respectively, while at Plant B the residual has changed from 2.0 ppm. to 0.70 ppm. within a 60-day period.

The higher residuals obtained through the medium of the new break-point flash control test render essential the development of more sensitive color standards through the range from 1.0 to 3.0 ppm.

Break-point chlorination has developed during the past four years through its initial and transitional stages into a more useful one. All of its characteristics are not yet known, but enough have been revealed to render it a valuable adjunct in the removal of tastes and odors and in the elimination of gas-forming bacteria. Continued research, both by the laboratory worker and by the operator in the field, is needed for its perfection.

## Acknowledgments

Acknowledgment is herewith given to those companys and towns who so kindly permitted the use of their water purification plant data in the preparation of this paper and to those friends who assisted in the accumulation of the data.

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## Discussion

### Louis J. Alexander [1]

Adams defines three periods during the development of chlorine treatment of water supplies. Before these three periods are definitely recognized by the water works profession, the writer thinks a fourth period could well be considered, one which would become chronologically the second period. This period covered 1926 to 1940 and during it pioneer work on super-chlorination was being carried out. Certain precepts of this process have been recognized by Howard, Scott, Faber, Calvert and others, but no special significance was attached to them at the time. It was A. E. Griffin who correlated, in Wallace and Tiernan Technical Publication 207, these various efforts and called attention to the significance of the break-point in the super-chlorination process for public water supplies. Enslow and Faber used the term "super-chlorination" to describe the process but it seems that many men have shied from this term for no good reason.

It was during this period that the writer carried out extensive experimental work in controlling iron and sulfur organisms. The writer now offers a paper which brings his previous paper of 1940 up to date. This paper presents experiences and conclusions regarding super-chlorination since 1940.

It is suggested that, if pioneer work had been fully accepted, there might not have been that period of "marginal chlorination" described by Adams. It may be well to accept this marginal period as one of the four periods or phases, however, because following the introduction of any new or pioneering work there should be a period of challenge by other experimentors. Such a challenge is wholesome and is as it should be. But it is the writer's belief that, if the full significance of the process of break-point or super-chlorination had been accepted by all rather than by a converted few, there would have been a great deal less difficulty in its use.

The writer feels that in 1940 there was not sufficient emphasis attached to the "true break-point," because he has long believed that true break-point is obtained only when all organic matter as well as nitrogenous compounds has been oxidized. (Oxidation is taken to mean "completely satisfying the chlorine demand" of the water.)

The writer offered the term "stable residual" in 1939, as being indicative of the results of true break-point chlorination. When a stable residual is attained, the flash test or any other test for residual will always show 95-100 per cent of the color with orthotolidine that it will show in 5, 10 or 20 min. Further, when a stable residual has been reached, five or six samples may be taken and tested for chlorine residuals at 30-min. intervals and each of these samples will have practically the same residual. If any organic matter remains, oxidation within the sample will continue and the residual obtained from each sample will become progressively less during several hours. If the chlorine residual after several hours is considerably less than the chlorine residual determined immediately on sampling, the true break-point is not attained. True break-point is evidenced only when the curve for reaction in domestic waters

[1] Design Engr., Southern California Water Co., Los Angeles, Calif.

showing the dose as abscissa and residual as ordinate, rises at nearly a 45-deg. line.

The writer is pleased that Adams has shown such complete data and that he brings out this so-called marginal period, because we can hope as a result that we now have passed the period of reasonable question and are proceeding into the period of acceptance of such an important process as break-point or super-chlorination.

**A. E. Griffin** [2]

Chlorination has passed from a stage of indefiniteness to one of precision. This means it is now possible to classify chlorination practice according to type. The types vary according to the magnitude of the chlorine residual obtained and according to the recognition given to the composition of the residual; that is, whether the residual consists mainly of chloramines or of free chlorine. Adams and Alexander have mentioned marginal chlorination, chlorine-ammonia treatment, super-chlorination and break-point chlorination as being specific types of chlorination practice.

Adams has shown the results that can be obtained by break-point chlorination when it is properly controlled. When break-point chlorination was first introduced it was thought that control could best be obtained by the mere indication of the presence or absence of a free chlorine residual. The Laux-Nickel, the Moore and the Keinath tests were devised to indicate the presence or absence of free chlorine residuals and various plants have used them for controlling break-point chlorination.

Plant practice has shown that the mere presence or absence of a free chlorine residual is not a conclusive indication of the break-point because free chlorine residuals can be present not only at the break-point but also short of that point and, under certain circumstances, they may even be present in the vicinity of the hump. This latter condition can easily prevail in waters of low temperature values or high pH values. Thus, the pattern for break-point chlorination reactions becomes one in which equal quantities of free chlorine and chloramine are present at the break-point; that as chlorination retrogresses from the break the percentage of chloramine increases and the percentage of free chlorine decreases; and as chlorination proceeds beyond the break the percentage of chloramine decreases and the percentage of free chlorine increases.

It is now known, both by theory and practice, that break-point chlorination cannot be controlled satisfactorily at the break due to the unstable residual that is obtained at that point. It has been adequately demonstrated that the control of break-point chlorination is best obtained by maintaining a residual past the break composed of 85–100 per cent free chlorine. Break-point chlorination control thus resolves itself into a quantitative differentiation test between free chlorine and chloramine residuals. This control must be sufficiently adequate and accurate in its manipulation to indicate the presence of a residual composed of 85–100 per cent free chlorine.

Early in 1940, P. C. Laux of Anderson, Ind., controlled this type of chlorination by adding chlorine to the water until an immediate or *flash* residual was obtained on addition of ortho-tolidine. Later, it was learned that this instantaneous color development represented free chlorine residual and any increase

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in the color thereafter represented chloramine residual. Thus, there came into existence a differential test for free chlorine and chloramines. In turn, it was pointed out that this could be made quantitative by reading the instantaneous color developed and the 100 per cent color development after a contact of 5 min. The first reading represents quantitatively the amount of free chlorine present and the difference between the two readings represents the amount of chloramine present.

From a laboratory and comparative point of view, the results, particularly in the case of low marginal residuals where chloramines may predominate, are not strictly accurate. This is due to the difficulty of standardizing the reading time following the addition of ortho-tolidine. For control purposes, however, it is entirely adequate because control depends upon the production and maintenance of free chlorine to the near exclusion of chloramines. There is thus little need to determine the exact amount of each.

Gilcreas and Hallinan (see page 1343, this JOURNAL) have standardized the reading time by applying sodium arsenite to the sample immediately after the addition of the ortho-tolidine. This is excellent for residuals consisting mostly of chloramines, but for break-point chlorination control, where the residual is composed largely of free chlorine, the test can be made more sensitive by reading the residual immediately after the addition of the arsenite than by waiting the full 5 min. as now directed.

The value of their test for the determination of false residuals due to manganese cannot be overestimated, for this is the first usable and accurate test yet developed for the purpose.

# The Practical Use of the Ortho-tolidine-Arsenite Test for Residual Chlorine

*By F. Wellington Gilcreas and F. J. Hallinan*

THE ortho-tolidine test has long been the standard procedure for the control of chlorination. The limitations of the technic are well known and have been the subject of much investigation in the search for a more precise indication of adequate chlorination. Many of the developments that have been proposed have failed to compensate sufficiently for interference by oxidized manganese, nitrites or oxidized iron. Furthermore, the ortho-tolidine (OT) test measures free chlorine, the less active chloramine and the chlorine that is combined with organic compounds and thus has little or no bactericidal capacity. As Butterfield and his coworkers (1) have shown, active chlorine is desirable for adequate disinfection of water. Thus, a technic is needed that will differentiate between chlorine and chlorine compounds and that will obviate interference. The flash test of Laux (2) has answered this need in part, in that it is a qualitative estimate of the chlorine that may be in the free or active state in relation to the total chlorine as shown by the OT test; it does not, however, allow for interference by manganese.

A modification by Hallinan (3) of the conventional ortho-tolidine method promises to meet the need for a more specific measure of chlorine. The test depends on the capacity of a reducing agent, sodium arsenite, to arrest the color reaction resulting from the combination of active chlorine with ortho-tolidine before the more slowly reacting chloramine and chlorine combined with organic compounds are affected. Interference by manganese, nitrites or iron is compensated for by a control portion, which is treated with sodium arsenite to neutralize all free chlorine and combined chlorine, followed by ortho-tolidine, which then reacts only with the interfering agents present.

### Procedure

1. Using three 1-oz. or 2-oz. French square bottles, or three cells of a commercial comparator, mark one A, one B and one OT.
2. Add 15 ml. of a sample of chlorinated water to each 1-oz. bottle; if 2-oz. bottles are used, add 50 ml.
3. Hold samples for the required period of contact.
4. Add a dropperful (approximately 0.75 ml.) of ortho-tolidine to OT. Mix by one quick shake.
   Add a dropperful of ortho-tolidine to A. Mix.
   Within 10 to 15 sec., add a dropperful of arsenite to A. Mix.
   Add a dropperful of arsenite to B. Mix.
   Add a dropperful of ortho-tolidine to B. Mix.

A paper presented on June 13, 1944, at the Milwaukee Conference by F. Wellington Gilcreas, Asst. Director in Charge of Labs. for San. & Anal. Chem., Div. of Labs. & Research, State Dept. of Health, Albany, N.Y.; and F. J. Hallinan, Chief Anal. Chemist, Armour Research Foundation, Chicago, Ill.

*Reading* *

*Active residual chlorine:* Arrange bottles, using portions A as sample and B as control. Read 3 min. after addition of the ortho-tolidine.

*False residual:* Read portion B alone 4 min. after addition of ortho-tolidine. If sample is colored or turbid, use an untested sample blank, as in the usual OT test.

*Chloramine:* Rearrange bottles, using portions OT as sample and A as control. Read at 5 min.

| | Read at | |
|---|---|---|
| A minus B | 3 min. | Active chlorine |
| B | 4 min. | False residual |
| OT minus A | 5 min. | Chloramine |

When the test is made with a 50-ml. portion of sample in 2-oz. French square bottles, the amounts of reagents remain the same, but in the test for chloramine 15 min. are required for full development of the color. The error due to dilution of the A and the B portions of the test with arsenite reagent is 1.5 per cent with 50-ml. portions and 5 per cent with 15-ml. portions. This error would appear to be negligible in plant control, but for more accurate results the readings should be multiplied by the proper constant.

## Precision of Method of Reading

By the double-bottle technic, values of active chlorine and chloramine are obtained by difference from and not by direct comparison with standards. Table 1 shows that the average deviation of reading among five observers was less than 10 per cent in the determination of chlorine residuals lower than 0.5 ppm.; with increasing chlorine residuals, precision of reading decreased. This discrepancy is typical of the error inherent in all colorimetric methods due to the difficulty of precise visual interpolation between high color intensities.

## Limitations of the Technic

Certain limitations in the technic were stated in a previous article (3); in the test for chloramine, owing possibly to the incomplete reaction between sodium arsenite and chloramine, the results may be 3.5 per cent low, an appreciable but not significant error. Products of the reaction of chlorine with organic matter, particularly amines, may also be included in the chloramine reading; thus, differentiation of chloramine from other forms of combined chlorine cannot be made.

In estimating chlorine added to distilled water of no chlorine demand, and in which all of the chlorine can be assumed to be in the active state, it has been noted that a reaction indicative of chloramine may occur. This does not appear to be an error inherent in the technic, however; a chloramine reaction did not occur when chlorine solution was diluted with water freshly distilled in an all-glass still and examined immediately.

The use of two reagents and the speed required in their addition to the test portion have not been found to complicate the technic unduly and no difficulties in this respect have been reported in the field use of the test.

## Routine Use of Test

In order to obtain data regarding this ortho-tolidine-arsenite (OTA) test, the operators of 35 water supplies in New York State were asked to join in a study by performing the test routinely for one month. When possible, all samples were to be collected after chlorine (and ammonia, if used) had been added but before any other treatment. A contact time of 10 min. was

* When using 1- or 2-oz. French square bottles for the test, the double-bottle technic of reading should be followed.

TABLE 1

*Ortho-tolidine-Arsenite Test for Residual Chlorine*
*Precision of Color Readings Using Double-Bottle Technic*

| Permanent Standards to Represent | | Difference (Calculated) | Difference (Observed) Average Readings by 5 Observers | Variation Between Calculated and Observed Readings | Percentage Deviation |
|---|---|---|---|---|---|
| A (sample) *ppm.* | B (control) *ppm.* | *ppm.* | *ppm.* | *ppm.* | |
| 0.05 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 |
| 0.05 | 0.03 | 0.02 | 0.02 | 0.00 | 0.00 |
| 0.05 | 0.05 | 0.00 | 0.0025 | 0.0025 | |
| 0.26 | 0.00 | 0.26 | 0.246 | 0.014 | 5.4 |
| 0.26 | 0.03 | 0.23 | 0.225 | 0.005 | 2.17 |
| 0.26 | 0.15 | 0.11 | 0.103 | 0.007 | 6.37 |
| 0.26 | 0.26 | 0.00 | 0.006 | 0.006 | |
| 0.50 | 0.00 | 0.50 | 0.486 | 0.014 | 2.8 |
| 0.50 | 0.26 | 0.24 | 0.204 | 0.036 | 15.0 |
| 0.50 | 0.40 | 0.10 | 0.068 | 0.032 | 32.0 |
| 0.50 | 0.50 | 0.00 | 0.02 | 0.020 | |
| 2.6 | 0.15 | 2.45 | 2.05 | 0.300 | 12.2 |
| 2.6 | 2.0 | 0.6 | 0.19 | 0.410 | 68.3 |
| 2.6 | 2.3 | 0.3 | 0.13 | 0.170 | 56.7 |
| 2.6 | 2.6 | 0.00 | 0.006 | 0.006 | |

A = Sample: chlorinated water + ortho-tolidine + arsenite.
B = Control: chlorinated water + arsenite + ortho-tolidine.

prescribed. Four readings were recorded: free chlorine (A minus B); chloramine (OT minus A); false residual (the B portion alone); and the conventional OT test (the OT portion). Hydrogen-ion concentration, temperature of the water and amounts of chlorine and ammonia added were also recorded. In addition, the district sanitary engineers of the State Department of Health were supplied with OTA test kits and requested to use the test in their routine inspections, submitting the four readings on each sample examined.

Twenty-two operators submitted complete reports. Eight reports were incomplete or obviously incorrect and the results, therefore, were not considered; five operators did not report. The results of the field survey have been tabulated to indicate the value of the OTA test, first, in compensating for interference from manganese and, second, in the differentiation of active chlorine from chloramine.

Three operators reported definite false residual values repeatedly; from each supply samples of untreated water were examined subsequently and found to contain significant amounts of manganese. Reports from other supplies indicated that false residual values were obtained occasionally. Table 2 gives the false residual values, together with the OT values reported for these supplies and also the manganese content as subsequently determined.

The capacity of the technic to differentiate active chlorine from chlora-

TABLE 2

*Detection of False Residual Values Due to Manganese by Ortho-tolidine-Arsenite Test*

| Supply No. | Number of Days Samples Tested | Number of Days Showing False Residual | OT Residual | | | False Residual | | | Total Manganese—ppm. |
|---|---|---|---|---|---|---|---|---|---|
| | | | Max.—ppm. | Min.—ppm. | Avg.—ppm. | Max.—ppm. | Min.—ppm. | Avg.—ppm. | |
| 1 | 31 | 23 | 0.75 | 0.3 | 0.49 | 0.1 | trace | ~0.05 | 0.20 |
| 2 | 29 | 29 | 0.6 | 0.3 | 0.43 | 0.15 | 0.05 | 0.13 | 0.10 |
| 3 | 28 | 28 | 1.5 | 0.3 | 1.0 | 0.18 | trace | 0.11 | 0.05 |
| 4 | 1 | 1 | 0.44 | | | 0.06 | | | 0.30 |
| 5 | 1 | 1 | 1.0 | | | 0.5 | | | 0.50 |
| 6 | 30 | 5 | 0.4 | 0.03 | 0.27 | trace | trace | trace | |
| 7 | 22 | 4 | 0.9 | 0.4 | 0.6 | 0.1 | 0.1 | 0.1 | |
| 8 | 30 | 3 | 1.7 | 0.8 | 1.3 | 0.2 | 0.1 | 0.13 | |
| 9 | 23 | 4 | 1.3 | 1.1 | 1.2 | 0.05 | 0.02 | 0.03 | |
| 10 | 27 | 5 | 1.1 | 0.6 | 0.86 | 0.15 | 0.1 | 0.11 | |

mine and other forms of combined chlorine is illustrated in the following frequency distribution charts. In Fig. 1, the percentage of active chlorine, as indicated by the OTA test, in comparison with the total residual, as determined by the standard OT test, is shown for each of the seventeen supplies furnishing complete reports and in which ammonia was not added as part of the treatment process. In three of the seventeen supplies, the active chlorine was less than one-third of the total residual for more than half the

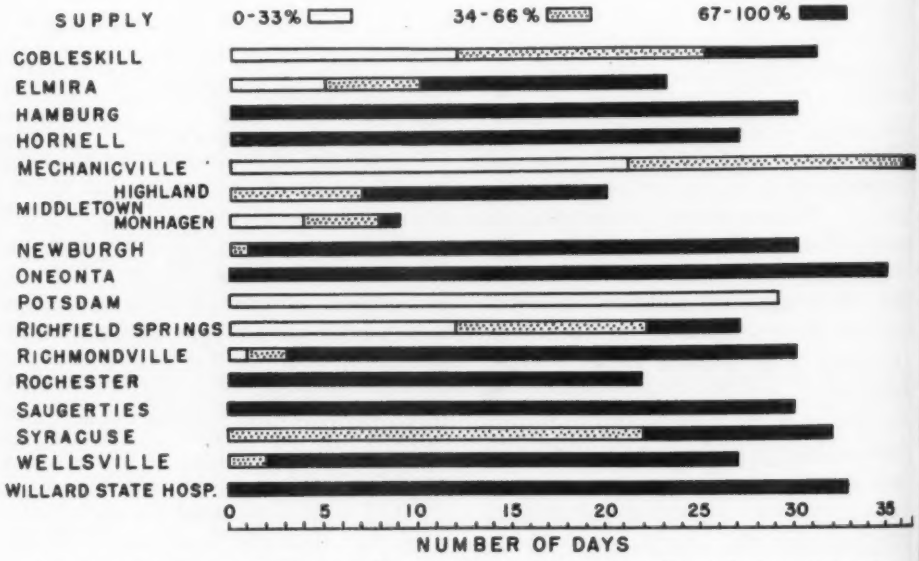


FIG. 1. Frequency of Occurrence Ratios of Active Chlorine to Total Ortho-tolidine Color in the Ranges 0.0–33 per cent, 34–66 per cent and 67–100 per cent, in Daily Observations at Seventeen Water Supplies to Which No Ammonia Is Added.

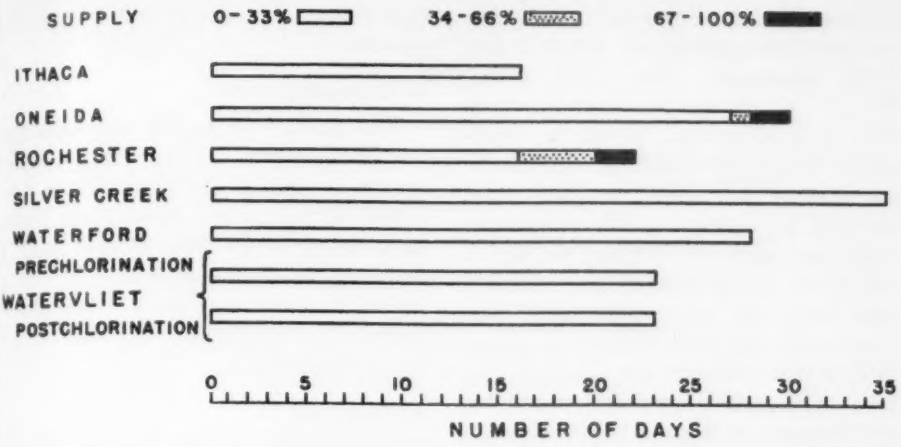


FIG. 2. Frequency of Occurrence Ratios of Active Chlorine to Total Ortho-tolidine Color in the Ranges 0.0–33 per cent, 34–66 per cent and 67–100 per cent, in Daily Observations at Six Water Supplies to Which Ammonia Is Added.

number of days of the test, while seven of the supplies showed less than one-third active chlorine more than once during the month. On these days, therefore, disinfection of the water was dependent on the more slowly acting and less bactericidal, combined chlorine formed by reaction of the added chlorine with ammonia or organic compounds naturally present. Seven of the supplies showed that less than two-thirds of the total residual was active chlorine at least half of the time. Only six maintained an active chlorine residual above two-thirds of the total residual for the complete period of the test.

Figure 2 gives the results of seven applications of the OTA test used in the control of six supplies to which ammonia is added as part of the treatment process. In two instances active chlorine residuals greater than one-third of the total chlorine were found, indicating that the dosage of ammonia was inadequate for complete reaction with the chlorine. Of 659 days represented by the readings of these 23 supplies, a false residual was found on 102 days; and on 84 days the chloramine residual was 0.3 ppm. or less, with no active chlorine present.

The reports by the field engineers of the department in their use of the OTA test in checking chlorination treatment of 52 supplies indicated that in eighteen the active chlorine was equal to or less than one-third of the total residual measured by the standard OT test. Fourteen supplies showed active chlorine equal to or less than two-thirds of the total, while twenty supplies had an active chlorine residual greater than two-thirds. A false residual value was disclosed in four of these supplies.

## Discussion

With such a test as the OTA test available, it becomes feasible to specify minimum residual values for active chlorine and for chloramine in public water supplies. The OTA test also has definite application in the control

of chlorination of waters containing oxidized manganese or other interfering substance. The alpha-napthoflavone (4) and starch iodide (5) tests that were developed earlier to overcome the errors resulting from such interference are more complex than the OTA technic, which is simple, rapid and accurate. It has the added advantage of measuring the interference with the ortho-tolidine-chlorine color under the same experimental conditions that influence the standard OT test. The results are thus not affected by changes in the oxidation of manganese in the test portion, as may be the case with other modifications of the OT technic or with proposed alternative procedures.

## Summary

The OTA test has been used routinely for one month by 22 public water supplies in New York State for the control of treatment by chlorination. The results indicate that the test has two important advantages: it is a simple and precise method for the elimination of interference by oxidized manganese in the OT test for residual chlorine; and it is a quantitative method for the differentiation of active chlorine from chloramine and similar chlorine compounds.

## Acknowledgments

The authors gratefully acknowledge the co-operation of the water supply operators and of the staff of the Division of Sanitation, New York State Department of Health, in this study; and the technical assistance of Miss Hazel V. Roberts, Senior Laboratory Technician, particularly in the statistical presentations.

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# Control of Iron and Sulfur Organisms by Super-chlorination and De-chlorination

## Experiences and Conclusions Since 1940

*By Louis J. Alexander*

THIRTEEN years ago the writer began extensive investigations and experiments to control slime growths and the accompanying odors and tastes occurring in well waters at the Sentney Plant of the Southern California Water Co. in Culver City. Efforts were based on the theories that:

(1) The slime growths and accompanying odors and tastes were caused by the presence of iron and sulfur and related organisms.
(2) All organic matter can be completely oxidized. (Although oxidation means a change in valence it is used herein to mean "completely satisfying the chlorine demand.")
(3) Use could be made of the great oxidation potential energy of chlorine solutions for more than the destruction of pathogens in water supplies.

Based on these three theories, the solution of our problems at the Sentney Plant at first seemed simple, because the water, although having odors and tastes as it came from the wells, was colorless and had no turbidity and the organic matter was microscopic. If the above theories were correct and the organic matter could be completely oxidized by the use of chlorine, the only remaining odor and taste should be that caused by excess chlorine. Then, by inorganic chemical reaction, the chlorine could be removed leaving no odor or taste. We knew that, although certain spores were not destroyed by the use of reasonable dosages of chlorine (in 1931, 0.5 to 2.0 ppm.; now in 1944, 10 to 15 ppm.), we felt that they could be rendered impotent.

Our three theories have been proven to be correct, but their application and the resulting control of this group of organisms was not easily accomplished. The first nine years' work was reported by the writer (1) in 1940. This work, started in 1931, was the introduction to and the beginning of the practice of super-chlorination and "break-point control" in controlling slime growths and their accompanying odors and tastes at the Sentney Plant.

Water at the Sentney Plant was not the only water which gave trouble. There were other plants where the water was contaminated with the same non-pathogenic organisms. These organisms, as most water treatment men know, do not grow in media used in

A paper presented on June 13, 1944, at the Milwaukee Conference by Louis J. Alexander, Design Engr., Southern California Water Co., Los Angeles, Calif.

making routine plate counts. They make their first appearance, generally speaking, as slime growths on the walls of forebay tanks and on the interior surface of pipelines. Occasionally, masses of slime break from the pipelines and are drawn from consumer taps and then the consumer makes himself heard in no uncertain terms. Growths occur in varying amounts and with varying degrees of intensity of odor and taste. Not all slime growths produce the same type of consumer complaint, although the growths have the same general appearance. Under the microscope these slimes show *Crenothrix, Leptothrix* and *Beggiatoa,* accompanied by myriads of mobile bacteria of the iron and sulfur groups.

As the intensive experimental work at Sentney proceeded, investigations were being extended to waters at other plants with some degree of success. The writer was too close to the "firing line" to have an objective view of the work except insofar as it produced practical results in eliminating odors and tastes. He and his co-workers were too engrossed with day-to-day accomplishment to be fully aware of the significance of the "break-point" or the "hump and dip" in the relationship of the curves of chlorine dose as compared with chlorine residual. In 1938 when the problem seemed to be under control, Faber (2) visited California and made a report on the results of the work accomplished at six plants of the company.

Some of the early efforts were questioned, and rightly so, by some water works men. Several were skeptical of the results which might be obtained, and questioned the advisability of chlorine dosages in the amount of 5 to 15 ppm. Such dosages were considerably higher than those required to control pathogenic organisms in clear waters. The experimenters felt that their theories were based on good engineering fundamentals, so in spite of early failures and some criticism the work continued. The Southern California Water Company's efforts and the fine work of others developed a process now called "break-point chlorination." This term, used to describe super-chlorination, was formally introduced to the water works profession at the Kansas City meeting of the American Water Works Association in 1940 by Wallace and Tiernan (3). Up to that time the writer had been using the term "stable residual" (4) to describe results obtained by the same process. Whether "break-point chlorination" or "stable residual" is used, the importance of the process in water treatment has been demonstrated by engineers and chemists at numerous treatment plants.

## Experiences Since 1940

Real benefit may be derived by reporting additional experiences in the use of any process if new applications can be demonstrated, cautions and warnings sounded, other and assisting treatment processes illustrated or new concepts formed. It is the writer's purpose in this paper to:

(1) Warn the water works man that the distribution pipe system needs special attention following the establishment of treatment at a plant.

(2) Describe the application of supplemental and assisting treatment processes.

(3) Describe the discontinuance of dechlorination with sulfur dioxide after super-chlorination in controlling slime-formers.

(4) Present suggestions for the use of laboratory analyses.

*The Distribution System and Slime Formers*

The writer has long held that there are three basic principles governing the delivery of a water "free from pathogenic organisms, pleasant to the taste, containing no color, turbidity or toxic minerals, and which is reasonably soft." These are: first, water must be so treated that it will meet all of these requirements as it leaves the plant; second, the distribution pipe system must be clean, that is, free from slime formations and free from deposits of sludges formed by organic or inorganic matter; third, there shall be no cross-connections with a questionable water source. (Cross-connections are problems of another sort and are not considered as part of the subject matter of this paper.)

At the time the writer presented his paper at Kansas City (1) on the control of slime-forming organisms, the length of time and the amount of effort necessary to clean up a distribution system had not been demonstrated. We were sure that the waters leaving the various plants were satisfactory, although there were occasional complaints about odors and tastes. Plant records showed that, for several years, the effluent had been sterile. But the occasional complaints caused concern, because they followed no uniform pattern in their description of odors and tastes, and because they were not originating in any specific area. It seemed reasonable to believe that in a period of years the originally contaminated distribution pipe systems should have been freed from all organic matter. We have since found that these distribution systems were not as clean as supposed.

In 1940 we purchased a water system adjacent to the Normandie system and installed a new distribution system of cast-iron pipe. A connecting line was laid tying the Normandie system to the newly laid system. Effluent from the Normandie Plant had a three-year record of being sterile, and when delivered to consumers on the new system (Manchester Heights) caused no complaints, but we were still confronted with a few from the original Normandie area. The one reasonable answer was that the slime coating had not been completely removed from the old pipe system. It seemed evident that efforts at cleaning up the various distribution systems had not been as effective as we had hoped. To test this idea several samples of pipe about 2 ft. long were cut from the pipelines of the old distribution systems. Data obtained from inspection of these samples were compared with data obtained from pipe samples cut several years before during the earlier experimental work. The original data indicated slime growths had accumulated on the interior pipe wall as much as $\frac{3}{4}$ in. in thickness. (It is interesting to note, in this connection, that because of the new U.S. Public Health Service requirement of distribution system sampling, many water works men are just beginning to find out what we have known for many years, that is, that all kinds of growing organisms will thrive in the distribution pipe systems though an apparently "perfect" water has been produced at the plant.) The new samples, however, showed a "slick" interior pipe surface with an occasional patch of slight thickness. These patches contained a mushy growth protected by a thick tough film of what seemed to be well-oxidized material. The mushy growth, saturated with a black slime solution, was highly acid in character. (The details of these

findings form the subject of an interesting corrosion study, one which is still in progress, under the direction of Carl Wilson.) We believe that the "oxidized film" was the result of permitting water with a high chlorine residual (0.75–1.0 ppm.) to leave the plant.

High residuals had been used intentionally, and their use had been accompanied by a regular and intensive program of flushing to remove organic matter from the pipelines. The results had been gratifying, based on the amount of organic matter removed. Regular flushing, however, had been discontinued when no more organic matter could be removed. This process had been used to clean the pipe systems because mechanical cleaning of many miles of all sizes and kinds of pipe seemed out of the question, both physically and financially. However, occasional complaints continued to describe odors and tastes of a "woody" or "marshy" or "rotten egg" flavor, but there were no complaints because of high chlorine residuals.

We experimented further with cleaning portions of the distribution system by sterilization with 50–100 ppm. of chlorine followed by forcing large volumes of high-pressure air through the pipeline and then flushing. It was found, however, that each application of this treatment merely removed one of several overlapping films of organic matter from the interior walls of the pipe. In other words, this process had to be repeated in order to remove completely all the films. This process was interesting but of little practical value. Fire hydrants for injecting and releasing air were not conveniently spaced. Sections of the system had to be isolated many hours at a time and there was unnecessary inconvenience to the consumer.

These experiences demonstrated, however, that it is an extremely difficult job to clean up a distribution system contaminated with slime-forming organisms. The caution to be sounded here is that for the control of iron and sulfur slime-formers the job is only half done when the water at the plant is shown to be properly and completely treated.

*Additional and Assisting Treatments*

In one system where taste and odor troubles had been almost entirely cleaned up, continued trouble was experienced with colored and dirty water in one section where there was relatively little use of the water. The color and turbidity were due in part to finely divided particles of organic matter and some iron compounds.

Water leaving the plant supplying this area was not satisfactory, although it seemed to be so. True break-point control had been adhered to rigidly. We looked for other reasons for this iron and organic matter; either aeration at the plant was not satisfactory or the detention time was not sufficient to permit precipitation of all of the end products of treatment. There was the further possibility that spores not destroyed in treatment gravitated to this area and germinated. Neither proper aeration nor increased detention time was physically possible at the time because of plant structure and for "priority" reasons. As an alternate treatment we tried the use of Calgon, hoping that it might retain the iron in solution and prevent the deposition of oxides, sulfates and sulfides and thus eliminate food for bacteria. This treatment was partially successful. Iron was held in solution, but slime

growths occasionally appeared. The use of Calgon was an experimental step, the value of which was not completely demonstrated.

We had more success in the use of Calgon as a supplemental treatment for slime control in the previously mentioned Manchester Heights distribution system. In anticipation of laying transmission lines within the original Normandie system to supply the Manchester Heights system, the operation of the old Manchester Heights pumping plant was discontinued. We felt it was not worth while to attempt treatment at the old plant because the previous owners had been unable to cope with excessive contamination of iron and sulfur organisms. The P-46 Order of the War Production Board abruptly changed our plans for construction of the transmissions lines and we were forced to leave them in the blueprint stage. It was necessary then, in order to meet the summer load, to place the previously abandoned plant in operation, and as a result it became necessary to devise adequate treatment. Treatment by the former owners had consisted of splash aeration, ozonation and the use of copper sulfate—all ineffectual. Our analysis and experience indicated that our type of aeration (compressed air through carborundum tubes) and super-chlorination would be sufficient. When the plant was placed in operation, it was found that this treatment was not sufficient.

Resorting again to the use of Calgon, and after several plant scale trials, the final treatment became: Calgon 10.0 ppm. and copper sulfate 0.8 ppm., mixed together and injected into the raw well water; next, aeration, which was accomplished by forcing compressed air through carborundum tubes at the rate of 1 cu.ft. of air to 2 cu.ft. of water, the water flowing downward in a tank through 10 ft. of rising air bubbles; then break-point chlorination with a dosage of 8.1 ppm.; then a detention of 40 min. of storage in a primary tank; and an average of 75 min. of storage in a booster forebay.

The purpose of each step was: Calgon fixed the iron and manganese and prevented formation of color; copper sulfate prevented the growth of *Beggiatoa;* aeration removed hydrogen sulfide and added oxygen to the water; chlorination completely oxidized all organic matter within the primary detention period. This treatment rendered the water usable and there have been no consumer complaints to date.

### *Discontinuance of De-chlorination With Sulfur Dioxide*

During the period when we were attempting to clean up the distribution systems, when a high chlorine residual in each plant effluent was being maintained, we were concerned that there might be consumer complaints because of chlorinous tastes. Such concern was unwarranted. As has been previously mentioned, there were complaints on tastes and odors caused by organic matter. Based on the amount of organic matter which was removed by flushing, following the release of water with 0.5 ppm. chlorine residual, and on the fact that such residual did not carry any great distance from the plant, as was evidenced by lack of complaints, it was felt that higher residuals might be attempted. By trial runs residuals were slowly built up in the plant effluent to 1 ppm. After reaching the true break-point, such residuals were easily controlled because we were proceeding up the "second rise" of the typical "break-point curve" and the in-

crease in residual was in direct proportion to the increase in chlorine dose.

An important development from these trials was that de-chlorination with sulfur dioxide was discontinued. As a result, because there were no complaints of chlorinous tastes, de-chlorination has been discontinued altogether. There is one exception to this at Sentney Plant, where activated carbon filters are still functioning as de-chlorinating agents. In most of these systems we are now able to maintain a plant effluent of between 0.75 to 1.0 ppm. without complaint.

The most consistent result we have had from our experiences with super-chlorination is that we have been able to discontinue de-chlorination with sulfur dioxide at all plants. The reason for successful treatment without de-chlorination is due to the fact that we have in all our treatment plants passed the "true" break-point and have reached the point where the relationship between dose and residual is in nearly direct proportion. True break-point control, in the writer's opinion, is obtained only when all organic matter has been oxidized.

*Laboratory Analyses and Plant Design*

Laboratory analyses, both bacteriological and chemical, form the basis for the design of any treatment process or plant. There are, however, limitations of laboratory control which should be recognized. We have found that laboratory findings are helpful but are not always conclusive. In all our work, while laboratory analyses guided us, it was only after full plant scale trial that complete adequacy of treatment was determined. It has been previously mentioned that, based on laboratory analyses, aeration and super-chlorination should have been sufficient at Manchester Heights, but plant scale operation indicated that both Calgon and copper sulfate had to be used as supplementary treatments. Final treatment in every case in our experience has grown out of a process of trial and error. Why treatment cannot be worked out conclusively in the laboratory is still an unsolved problem.

We can offer no explanation of why these waters with 1 ppm. residual have no chlorinous tastes, unless it is because there is a small ammonia content in these waters. We have used all technics to prove whether the residuals were truly chlorine residuals or "false indications." The fact that the residual increases in nearly direct proportion to the dose after break-point seems to indicate that it is a true chlorine residual. However, the fact remains that there are now no consumer complaints because of chlorinous taste.

These experiences helped confirm an opinion long held by the writer that there must be flexibility in plant design. The writer has seen too many plants, and tried to operate several, where flexibility was lacking in the original treatment plant design, not to be impressed with the fact that lack of flexibility is a serious handicap to plant operation. This is true regardless of the treatment problem.

## Conclusion

In controlling slime-forming organisms in a water supply we have found that control is only partly attained when the plant effluent is made sterile. It is equally important to clean up and maintain a distribution system free from iron and sulfur organisms, a system in which chlorine residuals will be carried to the remotest part.

Although break-point or super-chlorination is a basic treatment for water

containing slime-forming organisms, there may be other and assisting treatments which should not be neglected.

Experience indicates that in controlling slime-forming organisms by true break-point chlorination, de-chlorination is not always necessary.

While laboratory control is important it must be emphasized that plant scale trial provides the only final answer for correct treatment of such waters.

It should be emphasized also that an important consideration in any treatment plant design, whether it be for break-point chlorination or for any other treatment process, is that of flexibility. Treatment cannot be determined completely in the laboratory. It is almost always necessary to make adjustments in plant scale operation to arrive at an adequate treatment of any water.

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# The Bacteria in a Distribution System

*Albert M. Shannon and William M. Wallace*

A FEW years ago there was originated a study of conditions existing in the Detroit water distribution system, particularly in those sections in which there was little or no circulation. This investigation was designed to answer four general questions (1):

1. What bacteria are present in the distribution system and what is their public health significance?

2. Are after-products or toxic compounds which might prove irritating to the intestinal tract formed in the distribution system? If such compounds exist are they the result of the purification process or normal phenomena occurring in the quiescent portions of the distribution system? If such compounds are present are they caused by biochemical or biological action?

3. What is the best method of eliminating tastes and odors in the quiescent portions of the distribution system?

4. Are the present standards of water quality satisfactory?

It is realized that such a program as this is too ambitious to be completed in a short time and that some of the questions may never be answered satisfactorily. However, by careful research it is hoped some light will be shed on the problems. At present, the bacteria in the distribution system and their possible public health significance are still being studied.

Regularly since July 1940 samples have been collected from six dead ends located in widely scattered outlying sections of the distribution system and the filter plant grounds and from the locations of all complaints where the quality of the water was blamed for sickness of any type. In addition to these, samples of the chlorinated plant effluent, which for the first three years of this study carried a chlorine residual of from 0.15 to 0.25 ppm. and for the past year from 0.27 to 0.33 ppm., were collected at regular intervals and given identical treatment.

In every case the standard bacteriological technique as set up by *Standard Methods* was followed, and in addition to the standard agar, tryptone glucose extract agar was used, for it was found more favorable for the growth of the pathogens and yielded considerably higher bacterial counts. Also the incubation time was increased from 24 hr. at 37°C. and 48 hr. at 20°C. to 96 hr. and one week respectively. In addition, all samples were subjected to the enrichment and selective media technique for the isolation of any gastro-enteritis-causing organ-

A paper presented on June 14, 1944, at the Milwaukee Conference by Albert M. Shannon, Sr. San. Chemist, and William M. Wallace, Supt. of Filtration and Sewage Treatment, Dept. of Water Supply, Detroit, Mich.

isms that might be present. The isolation method was developed at the beginning of the work and has been reported in detail in a previous paper (1), but stated briefly, it is as follows: Since a finished water contains relatively few organisms, large samples—100 to 200 ml.—were collected and enriched with sterile tryptose and glucose solutions and incubated for 24 hr. at 37°C. Then an aliquot portion was added to tetrathionate broth base and incubated for 18 to 24 hr. This medium inhibited the coliform organisms, whereas the pathogens were permitted to grow almost unrestrictedly. Next, streak plates of MacConkey's Agar and SS Agar * were made. After 24 hr. at 37°C., well isolated, colorless, typical colonies were picked, inoculated into lactose broth, streaked on SS Agar and picked again to insure a pure culture for identification purposes. The SS Agar is an excellent medium to use for the isolation of the Gram-negative intestinal bacteria, the members of the *Shigella, Salmonella* and *Eberthella* groups, since it permits them to grow, yet inhibits the coliform and Gram-positive soil organisms. The few coliform organisms that do survive are recognized easily by their red color. The biochemical characteristics of the isolated organisms were determined by growing them in various media and from the results obtained, the genus was determined in *Bergey's Manual*. Agglutination reactions using known sera were completed wherever possible in order to verify the classification.

* SS Agar is a selective medium recommended for the isolation of *Shigella, Salmonella* and *Eberthella* organisms from stools and other materials suspected of containing these organisms. SS Agar was devised to provide differentiation of lactose fermenters from lactose non-fermenters and to give maximum inhibition of coliform organisms without restriction of the growth of pathogenic Gram-negative bacilli occurring in specimens.

### The Change in Disinfection

During the course of the study the treatment process during the summer months was changed. Prior to the summer of 1943 the policy was to use ammonia-chlorine disinfection only when the temperature of the plant effluent was below 55°F. and chlorine treatment only above that temperature. Since the fall of 1942, however, ammonia-chlorine disinfection has been used continuously the year around. The use of ammonia-chlorine disinfection, which gives chlorine residuals throughout the distribution system, with the exception of the quiescent portions and the dead ends, has had little more effect than chlorine alone on the average monthly bacterial count (Table 1) in the dead ends and the plant effluent. The dead end samples yielded from 350 to 14,000 colonies per ml. when incubated at 37°C. and 1,000 to 20,000 colonies per ml. when incubated at 20°C. when chlorine alone was used; and from 400 to 11,000 colonies per ml. at 37°C. and 700 to 13,000 colonies per ml. at 20°C. when ammonia-chlorine disinfection was practiced. The chlorinated plant effluent contained 17 to 56 colonies per ml. when incubated at 37°C. and 42 to 90 colonies per ml. when incubated at 20°C. with chlorine treatment; whereas the ammonia-chlorine treated water gave counts of 18 to 80 and 75 to 110 per ml. when incubated at 37°C. and 20°C. respectively. It must be remembered that an enriched agar was used and the incubation period was increased; also, when *Standard Methods* was followed the bacterial counts, although in some cases

TABLE 1

*Average Monthly Bacterial Counts*

| Disinfectant | Plant Effluent | | | | Dead Ends | | | |
|---|---|---|---|---|---|---|---|---|
| | Below 55°F. | | Above 55°F. | | Below 55°F. | | Above 55°F. | |
| | 37°C. | 20°C. | 37°C. | 20°C. | 37°C. | 20°C. | 37°C. | 20°C. |
| Chlorine | — | — | 17 to 56 | 42 to 90 | — | — | 350 to 14,000 | 1,000 to 20,000 |
| Ammonia-Chlorine | 10 to 60 | 25 to 66 | 18 to 70 | 75 to 110 | 100 to 1,600 | 600 to 2,700 | 400 to 11,000 | 700 to 13,000 |

high, usually fell within the limits for a pure water. The chlorinated plant effluent gave over a period of one year an average count of less than one colony per milliliter using standard agar.

The bacterial counts in the dead ends were influenced by several factors. Temperature had considerable effect since the highest counts were experienced during August, September and October when the water in the mains reached its highest temperature. The counts gradually decreased from then until March, when the lowest temperatures were recorded. The degree of disturbance had a marked effect, for as the organisms multiplied in the slow moving water they tended to settle to the bottom and as the velocity of flow increased they were swept into the current and gave much higher counts. This may explain why larger counts were found in the smaller mains and the lowest count in the largest main.

## Effect of Disinfection on Gram-negative Organisms

When the investigation was first started it was hoped that all the organisms could be identified and their public health significance determined. It was not realized, however, that there would be such large numbers and as many different species present. Accordingly the study has been mainly limited, through necessity, to the organisms that survived the inhibitory media, the Gram-negative bacteria. Any organisms producing gas in lactose broth, whether they confirmed or not, the organisms in the chlorinated plant effluent and occasionally the Gram-positive organisms found in the dead ends were isolated and studied.

During the winter months very few Gram-negative organisms survived the selective media technique and it was only during the summer and fall that the majority of them were found. This may be explained by the fact that during the summer months when the water temperature in the mains was higher, the organisms became more numerous and the probability of finding them was greater. Also the chlorine residuals did not reach as far into the distribution system. A chlorine residual has never been found in the dead ends.

A comparison of the number of Gram-negative colonies that were isolated at the dead ends, at the sources of complaints during 1943, when ammonia-chlorine was used as a disin-

fectant and at the sources of complaints during 1942, when chlorine alone was used, revealed no difference in the number of colonies found in the dead ends, but did show a large decrease in the number isolated from complaints. Between June and November 1943, 89 Gram-negative colonies were isolated, 80 from the dead ends and nine from complaints; between June and November 1942, a total of 190 colonies were found, 80 from the dead ends and 110 from complaints. During both years the greatest numbers of colonies were isolated during August and September.

## Gram-positive Organisms

During spring and fall, when the waters in Lake St. Clair turned over, the raw water supply contained innumerable spore-bearing organisms of lactose fermenting and non-lactose fermenting varieties. These spores were not killed by the chlorine doses administered and some of them passed through the filters and entered the distribution system. These organisms were found at certain periods in the plant effluent and throughout the year in the dead ends. The lactose fermenters proved to be mainly *Bacillus aerosporus* and other members of the genus *Aerobacillus,* whereas the non-lactose fermenter was *Bacillus subtilis.* These organisms are not considered pathogenic.

### *Gram-positive Chromogenic Coccus Organisms*

A superficial examination of the Gram-positive organisms found in the plant effluent and the dead ends has been completed; however, no attempt has yet been made to classify them. In addition to the large spore-forming rods already mentioned, there were innumerable chromogenic bacteria present, the majority being yellow or orange Gram-positive coccus forms of the genera *Micrococcus* and *Sarcina.* There were also a few Gram-negative yellow pigmented bacteria belonging to the genus *Flavobacterium* and some Gram-negative rods which were allocated to the genus *Achromobacter.* These organisms were encountered chiefly on the 20°C. agar plates and only rarely when they were incubated at 37°C.

### *Colonies From Dead Ends, Sickness Complaints, Plant Effluent*

As stated before, all samples taken from the dead ends, chlorinated plant effluent and the location of sickness complaints have been subjected to the selective media technique for the isolation of the Gram-negative organisms, among which are the pathogenic enteric bacteria. Typical colonies that have survived this treatment were picked, purified and stored on agar slants under sterile paraffin oil until there was sufficient time to study them. To date 495 colonies have been isolated and studied in detail, microscopically and biochemically. It was found that 42 colonies were Gram-positive coccus forms and five were Gram-positive rods, whereas 448 were Gram-negative rods (Table 2). Thirty-nine of the

TABLE 2

*Gram-negative Organisms Surviving the Selective Media*

| *Genus* | *No. of Strains* | *Percentage of Total* |
|---|---|---|
| Coliform Organisms | 146 | 32.5 |
| *Alcaligenes* | 92 | 20.5 |
| *Pseudomonas* | 57 | 12.7 |
| *Proteus* | 59 | 13.2 |
| *Eberthella* | 43 | 9.5 |
| *Salmonella* | 20 | 4.4 |
| Unknown | 31 | 6.9 |
| Total | 448 | |

Gram-positive coccus forms and the five Gram-positive rods were isolated prior to the installation of SS Agar as a purification medium and since then only three Gram-positive coccus forms have been found.

Of the 146 strains in the coliform group, 94 were typical *Aerobacter aerogenes,* seven were very slow lactose fermenters of the same species and eleven were atypical strains of two types, the more common of which was indol positive, methyl red negative, Voges-Proskauer positive and citrate positive. Five coliform colonies were allocated to the species *Aerobacter cloacae* because of their gelatin liquifying ability. The remaining coliforms were members of the genus *Escherichia;* six were typical *Escherichia coli,* eleven were atypical strains of five different types, the most prevalent of which produced hydrogen sulfide, and twelve colonies were placed in the species *Escherichia freundii,* since they did not ferment sucrose and produced hydrogen sulfide.

Among the 92 colonies of the genus *Alcaligenes,* 62 were *Alcaligenes fecalis,* fourteen were allocated to *Alcaligenes fecalis* var. *radicans* because of their gelatin liquifying ability, four to *Alcaligenes fecalis* var. *mariense* since they produced hydrogen sulfide and twelve to *Alcaligenes bookeri.*

Of the 57 colonies of the genus *Pseudomonas,* 50 were placed in the species *Pseudomonas incognita* and seven resembled *Pseudomonas aeruginosa.* Both species grew luxuriantly on nutrient agar at 37°C.

Forty-five of the total 59 *Proteus* colonies were *Proteus vulgaris,* whereas the remaining fourteen, because of their cultural characteristics and biochemical and seriological reactions, closely resembled *Proteus morganii,* a gastro-enteritis-causing organism. These strains were Gram-negative bacilli occurring singly, and were motile; they did not liquify gelatin but litmus milk was made slightly alkaline; acid and a slight amount of gas were produced on a glucose or a galactose medium, but no acid or gas was found when lactose, sucrose, mannitol maltose, arabinose, xylose, inositol, dulcitol or dextrin media were employed; indol was formed, but hydrogen sulfide was not; there was a very slight dirty-white growth on a potato medium. These reactions, together with the fact that several of these strains agglutinated *Proteus morganii* serum to a titer of 1:640, were the reasons why these organisms were believed to be a variant of the species *Proteus morganii.* True strains usually produce hydrogen sulfide.

The 43 colonies of the genus *Eberthella* that were isolated were of two varieties, neither of which was identical, biochemically, with the well-known pathogen *Eberthella typhosa.* Thirty-nine strains were classified as *Eberthella oedematiens,* a gelatin-liquifying organism and four were allocated to *Eberthella belfastiensis,* which did not liquify gelatin. Agglutination studies confirmed the above classifications in the genus *Eberthella,* for the *Eberthella oedematiens* organisms agglutinated *Eberthella typhosa* serum to a titer of 1:640 or higher, with several strains reaching a titer of 1:2560, and the *Eberthella belfastiensis* strains agglutinated the typhosa serum to a titer of 1:320 to 1:640. This does not mean, however, that these organisms can cause enteric fever. All it indicates is that they have common antigens and are members of the genus *Eberthella.*

Twenty of the colonies were allocated to the genus *Salmonella* by their

biochemical and seriological reactions. Other than generally to group similar strains, no attempt was made to place them in species, since classification by sugar reactions is too unreliable and appropriate sera were not available. One group of four strains, biochemically similar to the genus *Salmonella*, agglutinated *Salmonella paratyphi* serum to a titer of 1:160 and *Salmonella schottmuelleri* serum to a titer of 1:320, which indicated that this group had common antigens to the two sera and was a member of the genus *Salmonella*. The other group of sixteen strains was also biochemically similar to this genus except that it liquified gelatin slowly, agglutinated *Salmonella paratyphi* serum to a titer of 1:160 and higher, *Salmonella schottmuelleri* serum to a titer of 1:320 and higher and *Eberthella typhosa* serum to a titer of 1:320 and higher. It was thus indicated that, since these three sera have a common antigen, the organisms in question had the same antigen and, because their biochemical reactions were not similar to the genus *Eberthella*, they must be *Salmonella* organisms.

The remaining 31 colonies were of two varieties. Twenty-one strains were Gram-negative motile rods which did not produce acid or gas on lactose, arabinose, xylose, dulcitol and dextrin media, but did yield acid and occasionally a bubble of gas on glucose, sucrose, mannitol, maltose, galactose and inositol media. Gelatin was liquified and litmus milk was made slightly acid with curd formation and later digestion. Nitrate was converted to nitrite and indol was negative, methyl red negative, Voges-Proskauer positive and citrate positive. These organisms did not agglutinate *Eberthella typhosa*, *Salmonella paratyphi*, *Salmonella schottmuelleri* or any of the *Shigella* sera. The remaining ten strains had cultural characteristics, biochemical and seriological reactions similar to the above organisms with the exception that arabinose and dextrin were fermented with acid production, inositol was not fermented and indol was formed. As yet the genera of these organisms have not been determined.

The coliform organisms and members of the genus *Alcaligenes* are found normally in the intestinal tract of man and are generally considered nonpathogenic. *Pseudomonas incognita* is usually found in water and is nonpathogenic whereas *Pseudomonas aeruginosa* has been isolated from the intestinal canal, water, sewage, pus, sinuses, etc., and according to Topley and Wilson (2) has a low pathogenicity to man giving rise to diarrhea and general infections in infants. *Proteus vulgaris* has been associated with putrefying animal and vegetable matter, often with feces and soil and is not considered pathogenic; *Proteus morganii* has been found in the intestinal canal in normal or diarrheal stools and is believed to be the cause of summer diarrhea particularly among children.

Both species of *Eberthella* have been isolated from the intestinal tract of man in dysentery suspects and in enteric fever. The genus *Salmonella* has been associated with gastro-enteritis mainly of the food poisoning type.

The coliform strains, *Alcaligenes* and *Pseudomonas incognita*, appear to have been widely scattered throughout the distribution system, for, with the exception of the dead end in the filter plant grounds, they have been isolated from all the dead ends and from several sickness complaints. The coliform organisms were usually found in the vicinity of some new construction or a

recent main break. The *Pseudomonas aeruginosa* strains, which have been considered pathogenic, were found during the disinfection of a new main outside the city, which, during the process of construction under a viaduct, had become partially filled with surface water from a district that had primitive sewage facilities. A few strains of both *Eberthella* species and the unknown variety were isolated from this location. *Proteus vulgaris* organisms have been found in all the dead ends except the one in the filter plant grounds and from several sickness complaints.

The organism resembling the pathogen *Proteus morganii* has never been located in the dead ends and has been isolated on only two occasions, one from a sickness complaint in a trailer camp which had installed a new main without disinfecting and the other from a new construction job which used old pipe and placed it in service before it was properly disinfected. The newly-laid main led to an old one running under the river to an island and 4 mi. down the island. It was from this point that the samples were taken. A few strains of *Salmonella* and of the unknown variety were also isolated.

The organisms of the genus *Eberthella* were located in three dead ends, the *Salmonella* in four dead ends and the unknown genera in three dead ends and from several complaints.

## The Problem Posed

What significance, if any, do these organisms have and how do they enter the distribution system are the questions that are raised at this time and which are difficult to answer definitely. It can be stated, however, that Detroit has experienced no outbreaks of typhoid or dysentery and although several complaints of gastro-enteritis of a mild form have been received, examination of the water at the complainants' homes yielded none of the organisms of the genus *Eberthella* or *Salmonella*. The organisms resembling *Proteus morganii* were isolated from samples taken from a gastro-enteritis complaint at a trailer camp where a small main in the vicinity of an outhouse was repaired without disinfection. In another instance this same organism, together with *Salmonella* strains, was found at a naval base and, according to the medical department there, there was no increase in the amount of gastro-enteritis. *Pseudomonas aeruginosa* and the *Eberthella* strains were isolated before a new main was released for public service.

## The Reinfection Theory

Thus several organisms that were either pathogenic or related to pathogens have been located in the distribution system, yet samples regularly collected from the plant effluent and from the dead end in the filter plant grounds have failed to produce any of these organisms, with the exception of a few strains of *Alcaligenes*. This must mean, then, that either the organisms were present in the plant effluent and escaped the means of detection used, were altered by the chemical treatment and recuperated later, or reinfected the distribution system through main breaks, new construction, cross-connections, etc. The majority of evidence presented tends toward the latter theory that main breaks, new construction, etc., are responsible. Further investigation should clarify the whole field.

## Summary

1. Samples have been collected since July 1940 from six dead ends in widely scattered outlying sections of the Detroit distribution system, from the filter plant grounds and from the locations of all sickness complaints. These have been subjected to the standard bacteriological technique and a selective media technique for the isolation of gastro-enteritis-causing organisms.

2. During the course of this study the disinfecting process in the filtration plant was changed from chlorine treatment in the summer months to year-round ammonia-chlorine disinfection. This change had little effect upon the bacterial counts in the dead ends and plant effluent. Temperature and the degree of disturbance in the main influenced the counts considerably.

3. The change in disinfecting treatment had little effect upon the number of Gram-negative colonies isolated from dead ends. Continuous ammonia-chlorine treatment caused, however, a marked decrease in the number of colonies isolated from complaints. The gastro-enteritis-causing organisms are members of the Gram-negative group. These latter organisms were usually found between June and November.

4. Gram-positive spore-bearing organisms, *Bacillus aerosporus*, other members of the genus *Aerobacillus* and *Bacillus subtilis* were found in the plant effluent during spring and fall and throughout the year in the dead ends.

5. Gram-positive chromogenic coccus organisms of the genera *Micrococcus* and *Sarcina;* Gram-negative yellow pigmented *Flavobacterium* and colorless rods of the genus *Achromobacter* have been found on 20°C. agar plates.

6. 495 colonies have been isolated from dead ends, localities of sickness complaints and chlorinated plant effluent. Forty-two were Gram-positive coccus forms, five Gram-positive rods and 448 were Gram-negative rods. One hundred forty-six (32.5 per cent) were members of the coliform group, 92 (20.5 per cent) belonged to the genus *Alcaligenes,* 57 (12.7 per cent) to the genus *Pseudomonas,* 59 (13.2 per cent) to the genus *Proteus,* 43 (9.5 per cent) to the genus *Eberthella,* 20 (4.4 per cent) to the genus *Salmonella* and 31 (6.9 per cent) are unknown at present.

The coliform organisms consisted of 94 typical *Aerobacter aerogenes,* seven slow lactose fermenters, 11 atypical strains of two varieties, five *Aerobacter cloacae,* six typical *Escherichia coli,* 11 atypical strains and 12 *Escherichia freundii.* The *Alcaligenes* colonies were allocated to 62 *Alcaligenes fecalis,* 14 *Alcaligenes fecalis* var. radicans, four *Alcaligenes fecalis* var. mariense and 12 *Alcaligenes bookeri.* Of the *Pseudomonas* colonies, 50 were *Pseudomonas incognita* and seven resembled *Pseudomonas aeruginosa.* Forty-five of the *Proteus* strains were *Proteus vulgaris* and 14 resembled *Proteus morganii,* a gastro-enteritis-causing organism. The genus *Eberthella* was divided into 39 *Eberthella oedematiens* and four *Eberthella belfastiensis,* neither of which resembled the typhoid organism, *Eberthella typhosa.* No attempt was made to classify the *Salmonellas* into species.

7. What significance is to be attached to the presence of these organisms that resemble pathogens is dif-

ficult to answer, for Detroit has experienced no outbreaks of typhoid or dysentery, although complaints of a mild form of gastro-enteritis have been received. Examination of the water at the homes has failed to produce any *Eberthella* or *Salmonella* organisms. On one occasion an organism resembling *Proteus morganii* was isolated from a gastro-enteritis complaint from a trailer camp. It was proven that the trailer camp was responsible for its presence.

8. With the exception of a few strains of *Alcaligenes*, none of these organisms has been found in the chlorinated plant effluent nor in the dead end located in the filter plant grounds. This must mean that either the organisms were present in the plant effluent and escaped detection by "selective methods," were injured by the chemical treatment and recuperated when they reached favorable conditions, or the water became reinfected through new construction, main breaks, cross-connections, etc. At present the majority of evidence favors the reinfection theory.

## Acknowledgments

In closing the authors wish to express their appreciation to L. G. Lenhardt, General Manager of the Detroit Department of Water Supply, for his instigation of this work and for the support they have received from him and from the Board of Water Commissioners of the city of Detroit. Their continued interest has made this study possible.

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# A Consolidated Coliometer for Streamlined Water Bacteriology

*By A. Adler Hirsch*

SINCE the introduction of the fermentation tube by Theobald Smith (1) the detection of coliform bacteria has been based on their power to ferment dextrose (later lactose) with production of gas. Vessels designed to collect this gas have included the Smith type American Public Health Association standard fermentation tube, which is a V-shaped tube with a bulb in its open shorter leg; the familiar Durham tube, which contains an inverted vial that fills with liquid media during sterilization; and the recent Cowles loop (2), which fills with broth merely on being dropped into a culture tube. In current practice a confirmatory fermentation is obtained by inoculation from the primary gas tube into a secondary broth. An automatic transfer between enrichment and confirmatory tubes by means of an inverted U-shaped siphon has been assembled by Wells (3). Aside from its automatic feature, this arrangement offers the advantage of prompt inoculation of the selective medium at the time of vigorous growth in the primary tube.

Upon realizing the value of a large sample volume, several investigators recommended direct culture in the original sample bottle. Weiss and Hunter (4) added concentrated nutrient broth, without lactose, to the residue remaining in the usual size sample bottle after removal of conventional portions for the regular test, and, without providing for gas collection, routinely streaked a loopful of broth on eosin-methylene blue agar the next day; on the second day they fished a colony into a standard lactose broth and a 2-per cent Bacto-brilliant green bile broth for confirmation. Following adoption of the 100-ml. test portion alternate in the 1942 U.S. Public Health Service Standards (5) and the prevailing interest in civilian defense as affecting protection of public water supplies, several organizations demonstrated a technique for allowing gas formation to proceed directly in the sample bottle. In one such method (6) a 100-ml. portion is collected in a sample bottle containing concentrated lactose broth and a Durham vial that is made to fill with liquid simply by inverting the bottle. The device described below is a natural elaboration of this abbreviated procedure.

A paper presented on June 14, 1944, at the Milwaukee Conference by A. Adler Hirsch, Instructor in Water Purification, Sectional School on Water Supply and Sewerage, State Dept. of Education, Baton Rouge, La.

## The Coliometer

The prime object of the coliometer is to combine sampling, volume distribution, culturing, gas collection and confirmation all in the same specially designed bottle. Originally the purpose leading to this development was to simplify and to abridge equipment and procedure so that even the most modest water system might perform its own routine bacterial testing.

Another incentive was the failure of the customary five 10-ml. portions to indicate whether a water sample was substandard unless contamination exceeded the allowable limit by 100 per cent. While the substitution of 100-ml. portions does supply sufficient coverage theoretically, the size of equipment and amount of media required becomes an item of conscious expense. Therefore portions of varied sizes seem attractive, since a single sample may then show significantly and economically the coliform density throughout the range usually encountered in potable waters.

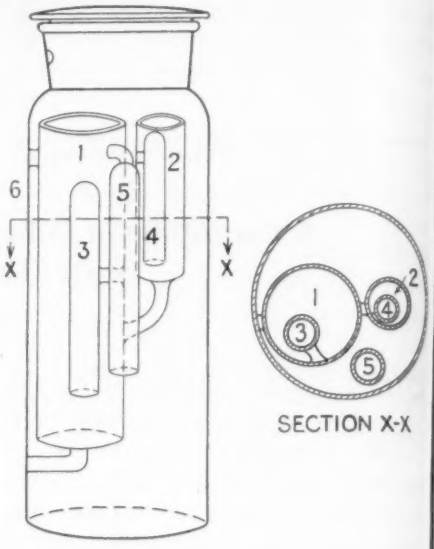


FIG. 1. The Coliometer

### *Primary Gas Bottle*

As may be seen in Fig. 1, the coliometer consists of a conventionally shaped, ground-glass stoppered bacterial sample bottle of Pyrex in which are fused auxiliary reservoirs [1 and 2] of 50- and 10-ml. capacity, respectively. The bottom of the bottle retains a 100-ml. portion of the sample. A mark [6] shows the level to which the water should properly come so that the separate volumes may be suitably subdivided. Inverted vials [3, 4 and 5] indicate gas formation in each individual reservoir. All tubes are nested compactly on the same side of the bottle in order to provide proper pneumatics during manipulation. Attachments of the tubes are by means of glass struts to allow strain-free connections. A small air hole and breather port [7] in the bottle neck and stopper supply ventilation for aerobic cultures.

To use this device 2.92 g. of dehydrated lactose broth, calculated for 160-ml. sample size on the basis of 35-ml. quadruple-strength broth per 100-ml. portion (5), is placed in the bottom by means of a volumetric spoon, and 5 ml. of water is added. If desired, a like volume of sterile concentrated broth may be pipetted into the previously sterilized coliometer. Otherwise the bottle with medium is autoclaved at 15 lb. for 15 min. In this condition the device is held ready for sampling.

A sample is drawn from a sterilized tap, adhering to recognized methods, filling the coliometer to the mark. Care is taken so that water does not enter the side-wall reservoirs prematurely, thereby causing some error in total sample volume. The bottle is next

swirled horizontally to mix media and sample uniformly. To fill the auxiliary reservoirs the bottle is inverted several times and so oriented that when lying flat the tube bundle is at the bottom completely submerged under liquid. Liquid levels in the side tubes drop sufficiently on turning the bottle upright so that spill or splash during ordinary handling is prevented. A dye test with methylene blue showed that uniform mixing is readily obtainable within the apparatus. The sample is now ready for incubation and observation.

*Confirmatory Loop*

Since automatic re-inoculation into confirmatory broth is desirable, this feature is provided by placing a looped tubeful of 2-per cent brilliant green bile broth (see Fig. 2) in the bottom of the bottle and another in the 50-ml. reservoir. These loops are introduced aseptically, shortly after the start of incubation, by means of a sterile wire hook which lifts them from a stock jar of B.G.B. broth. Leakage during this manipulation is minimized by the capillary tip. Cross mixing between the broths is negligible. The tube must have a length somewhat greater than the diameter of the bottle so that it will rest in an oblique position; also the length from the bottom bend to the top of the gas trap should be less than the height of the 50-ml. reservoir so that the secondary broth will remain in the loop.

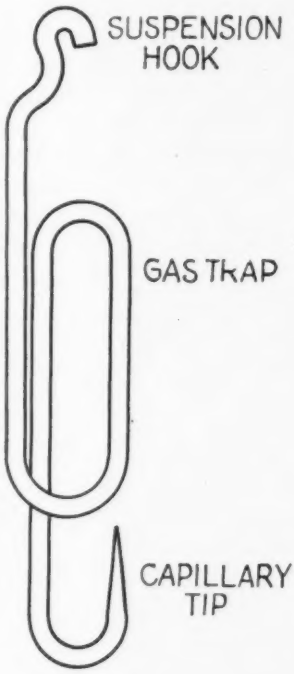


FIG. 2. Loop for Confirmatory Test With Brilliant Green Bile Broth

If coliform bacteria are present in the water sample, they become enriched in the lactose broth and then invade the loop through the capillary tip, causing secondary gas to collect in the gas trap. Incubation and observations follow the directions given in *Standard Methods*. This short cut is inapplicable to the 10-ml. portion because of the small size of the reservoir. In the case where only the 10-ml. portion shows primary gas formation, the usual secondary replant is made externally, or the 10-ml. reservoir tilted to contaminate the bottom of the bottle where a loop is resting.

## Numerical Interpretation of Results

The coliform density in a water sample is estimated from the array of volumes, positive and negative, using either the M.P.N. concept or an adaptation of the coliform index. Various possibilities and their numerical values are shown in Table 1. M.P.N. figures were obtained from Hoskins (7), Table 9, for 100-, 50- and 10-ml. inocula.

TABLE 1

*Numerical Estimate of Coliform Density in Coliometer by M.P.N. and Coliform Index*

| Size Inocula—ml. | | | M.P.N. per 100 ml. | Coliform Index | |
|---|---|---|---|---|---|
| 100 | 50 | 10 | | Organisms per ml. | Organisms per 100 ml. |
| − | − | − | <0.65 | ≦1/160 | ≦ 0.62 |
| − | − | + | 0.65 | 1/160 | 0.62 |
| − | + | − | 0.78 | 1/150 | 0.67 |
| − | + | + | 1.6 | 2/160 | 1.3 |
| + | − | − | 0.98 | 1/100 | 1.00 |
| + | − | + | 2.3 | 2/110 | 1.8 |
| + | + | − | 3.9 | 1/50 | 2.0 |
| + | + | + | >3.9 | ≦1/10 | ≦10 |

One weakness of the coliform index is its arbitrary reassignment of positive results in the case of skipped positives between three successive volumes. This objection is avoided by summing the number of positive tubes and the significant volumes involved. Admittedly some of these interpretations are subject to question, but this principle furnishes a simple means for estimating coliform density with fair accuracy in any combination of volumes. Satisfactory agreement is shown between the M.P.N. and coliform index per 100 ml. in the table.

In order to compare the range of coliform concentrations evaluable by the orthodox quintuplicate 10- or 100-ml. portions with those indicated by the coliometer, Table 2 shows the M.P.N. and coliform index estimated for the five standard portions. M.P.N. values were taken from the 1942 U.S.P.H.S. Standards.

Comparative spot-type plots of these densities in Figs. 3 and 4 show that better statistical coverage, over a wider spread in the potable water range, is possible with the coliometer than with the conventional five equal size portions. On the basis of coliform index, superiority of the coliometer is clearly evident, since there exists an important gap in slightly substandard waters in which the 10- or 100-ml. portions are mute, but where the coliometer yields significant information.

## Advantages

Below are listed some of the advantages inherent in the coliometer for routine testing of bacterial quality in public water supplies. Its only fundamental disadvantage is the need for careful handling to avoid breakage.

1. *Simplified technique.* Since culturing is concurrent with sampling this method should allow supplies without laboratories or technical personnel to test their own product with the benefit of more frequent examinations than the state department of health can usually undertake. Results are available more quickly. Aside from the initial preparation of the coliometer, all laboratory work is eliminated from the test as usually made. It is possible for a central station to prepare coliometers and issue them to the smaller supplies for use on the spot, especially if only primary gas formation is to be observed.

TABLE 2

*Coliform Density Enumerable by Five Standard Portions*

| No. of Positive Tubes | 10-ml. Portions | | 100-ml. Portions | |
|---|---|---|---|---|
| | M.P.N. per 100 ml. | Coliform Index per 100 ml. | M.P.N. per 100 ml. | Coliform Index per 100 ml. |
| 0 | <2.2 | <2 | <0.22 | <0.2 |
| 1 | 2.2 | 2 | 0.22 | 0.2 |
| 2 | 5.1 | 4 | 0.51 | 0.4 |
| 3 | 9.2 | 6 | 0.92 | 0.6 |
| 4 | 16.0 | 8 | 1.60 | 0.8 |
| 5 | >16.0 | ≧10 | >1.60 | ≧1.0 |

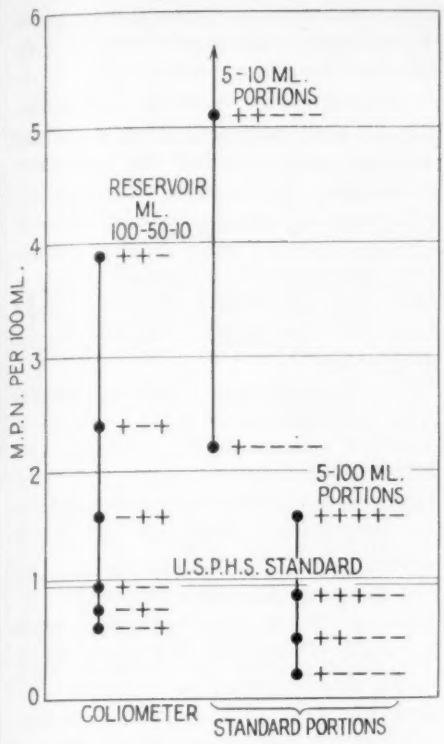


FIG. 3. Comparative Coverage of M.P.N. by Coliometer and by Standard Portions

*2. Reduced equipment and supplies.* The need for ordinary sample bottles, pipettes, dilution flasks and Durham tubes is eliminated. An appreciable economy in the consumption of media is apparent, since with standard five 100-ml. portions the amount of dehydrated lactose broth required is 9.11 g., whereas with the coliometer the 160-ml. sample takes 2.92 g. As this material costs nearly $7.00 a pound, the monthly savings on a daily test amounts to $2.88. Also there is a savings in B.G.B. broth, since the coliometer loop uses only a negligible amount as compared to the usual 10-ml. secondary tube.

*3. Savings in time.* All laboratory work following the act of sampling is eliminated. Since growth starts immediately, the results are available earlier than if samples were transported to a laboratory for planting. In a test with 160-ml. Lake Charles tap water, contaminated with 1 ml. of settled sewage, primary gas was formed in less than 12 hr., and within 24 hr. more the B.G.B. loop confirmed the presence of the coliform group. Most of this test was carried out while traveling by auto; customary incubation should have accelerated the test. Thus a confirmed test was available on

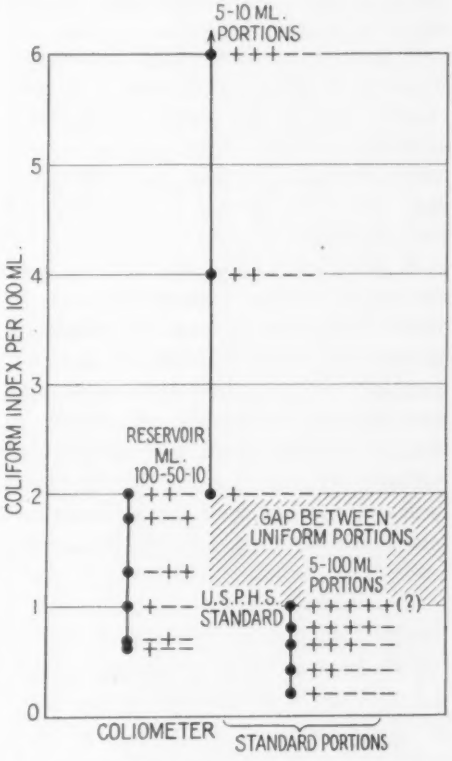


FIG. 4. Comparative Coverage by Coliometer and by Standard Portions Based on Coliform Index per 100 ml.

the spot within 36 hr. after sampling, and without laboratory work.

4. *Accuracy.* Since the sample is planted immediately, all changes due to standing are avoided. The self-contained features reduce the chances for outside contamination. Any chlorine residual is dissipated by the organic material in the medium. As soon as vigorous growth starts, the B.G.B. loop becomes seeded, thereby increasing the possibility of confirmation. A positive gas former need not await routine laboratory examination before transfer. No new bacteriological media or principles are employed, and therefore the previous fund of experience with standard lactose broth and B.G.B. are directly applicable.

5. *Adequate statistical coverage.* Figures 3 and 4 show that the coliometer covers the range of bacterial densities of interest in potable waters more revealingly than do either the five 10-ml. or five 100-ml. standard test portions.

6. *Flexibility of apparatus.* The principles of the coliometer may be utilized for other sizes and subdivisons of samples. One possible change, desirable for distributing more uniformly the numerical coverage of results, is the substitution of the geometric mean volume, 31.6 ml. for the 50-ml. reservoir. As other gaseous fermentation media are developed in the future for direct detection of coliform organisms, the coliometer will furnish results without need for the secondary loop.

The coliometer, a sample bottle having integral auxiliary reservoirs and inverted vials, combines the operations of sampling, inoculation, culturing, gas collection and implantation into secondary broth with greatly reduced laboratory manipulation, a marked saving in time and materials and closer adherence to fundamental bacteriological desiderata.

A patent application has been filed to cover this device.

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# Benefits of Bi-monthly Meter Reading

BEGINNING July 1, 1943, the Los Angeles Department of Water and Power decided to revise its meter reading policy. For a number of years every electric and water meter had been read monthly. As a routine management policy for peacetime it had been satisfactory. But the southern California area has been one of the nation's most critical manpower areas since the war production program got under way. Thus the city's great utility found it necessary to resort to every possible adjustment in its operating practices in this important area in order to keep water and power services to the public at a safe and satisfactory level.

Among the changes decided upon was that of reading *domestic* meters (electric and water) bi-monthly. No changes were made in reading frequency for commercial and industrial meters.

When the change was initiated, it was pointed out that the domestic consumers would save half of their postage and check writing expense. This, it was estimated, would amount to at least $80,000 per year. Since the department was the largest user of U.S. mails in the city, the postal employees were relieved of a great volume of work. More than a million less pieces of mail would be sent out by the department—a saving here alone of $64,000 in postage.

Conservation of paper and envelopes was estimated at 3,450,000 less bills, 3,300,000 less envelopes, 3,300,000 less ledger cards and 905,000 less courtesy notices. (A courtesy notice is a polite name for a form of advice that the bill has not been paid promptly.)

While the complete year's experience revealed that some other minor factors contributed in part to the lowering of personnel required by the Commercial Division, the greatest decrease in the number of employees was due to the reduced work volume occasioned by the bi-monthly billing. With almost 900,000 active water and electric service accounts (550,000 residential water and electric consumers), the Commercial Division personnel was reduced by 138 persons during the year. Figure 1 shows monthly, from January 1942 to July 1944, (a) Commercial Division personnel, (b) meter readers and (c) total meters read.

The bi-monthly procedure reduced meter reading by approximately 37 per cent and other activities such as addressographing, billing, mailing, bookkeeping, office and field collecting were reduced to a lesser degree. Telephone order clerks, field investigators and

Derived from reports made by Homer C. White, Commercial Director, Los Angeles Department of Water and Power, Los Angeles, Calif.

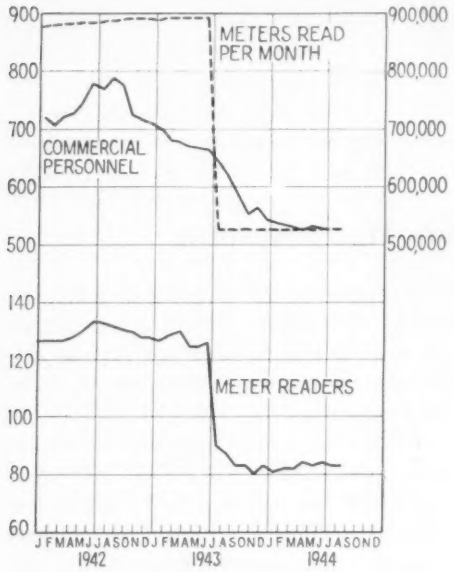


FIG. 1. Meters Read, Commercial Personnel and Meter Readers

field service men were not affected. As a result, the over-all reduction in personnel in the division was approximately 21 per cent.

Most of the employees in the division, including meter readers, work on a basis of 170 hr. per month and there has been no material change in working periods since 1942.

After a year of rendering residential bills on a bi-monthly basis, it is gratifying to note that the departure from monthly billing has been well received by the customers and is now accepted as a matter of course.

Collections reflect the present economic trend—75.1 per cent of all bills are paid within 15 days from presentation and 99.91 per cent of the payments are made within the cycle of the billing period.

Bi-monthly billing has had no ill effect on write-off to bad debts. Collections have been excellent, which, to some extent, is due to economic conditions. The percentage of write-off for both water and electricity of all classes is now the lowest it has ever been—$\frac{3+5}{100}$ of 1 per cent of billings.

There has been no indication of curtailment in the use of residential water and electricity. In fact, there has been an increase in the consumption of both commodities during the past year; therefore, it is obvious that the bi-monthly plan has had no material effect on sales of water and electricity.

When the plan was adopted, it was estimated that the department would save $270,000 through reduction in personnel, postage, materials and automotive and office equipment. After twelve months, it is recorded that the saving due to bi-monthly billing has been $365,000 for the fiscal year (plus 40¢ per connected water or electric meter per year).

The first year of experience with the bi-monthly plan has proved entirely successful, both from the customer's and department's standpoint.

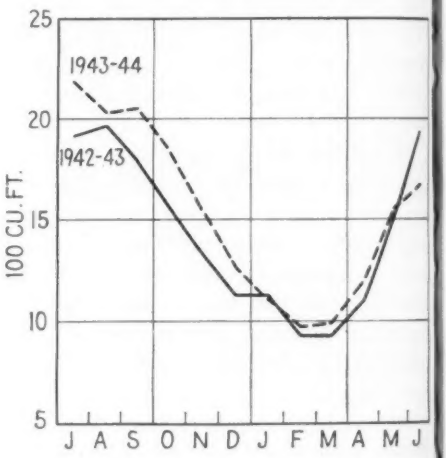


FIG. 2. Water Consumption per Residential Consumer

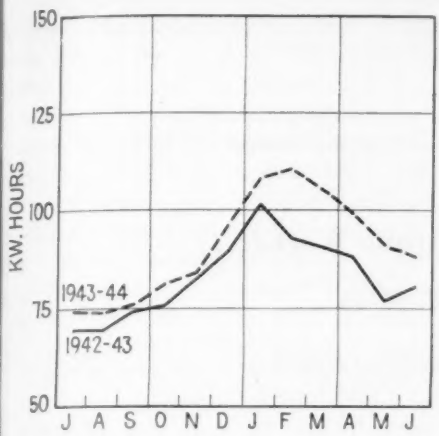


FIG. 3. Electric Consumption per Residential Consumer

The war effort was aided, the department benefited from economies and the customer profited in time and expense.

Water utilities generally have met the problems of personnel shortages by reduction of construction and maintenance work. The first was made fairly simple by the inability to initiate new work. Construction materials could not be obtained except for properties whose problems were directly related to war demands. Maintenance programs have been scaled down; meters removed for testing less frequently; valve and meter boxes less frequently inspected. All of these changes in policy saved manpower.

But no more conspicuous shift to bimonthly meter reading and billing occurred elsewhere in the United States.

Meter readers have an important consumer contact and public relations function in peacetime. They can be and in many places are bearers of good will from the water utility management. Whether the good-will program needs monthly action in peacetime will be carefully pondered by Los Angeles and all the other cities where the bimonthly billing policy has been initiated during the war period, when the question of returning to monthly billing is reviewed.

# What Kind of Public Works?

*By Henry B. Bleck*

TO the question "What kind of public works" we may well add, "Why, how and whose money." Federal and state policy with reference to municipal postwar public works is still nebulous. Because the population of the nation is two-thirds urban, re-employment and readjustment problems, when they arise, will again be centered in the cities. In Illinois three out of every four persons are urban residents.

We have heard about the Committee on Economic Development and the laudable plans for industrial reconversion. We have not heard enough about government plans to help effectuate orderly reconversion without mass unemployment. To date there has been a deficiency of interest and also public information about postwar public works planning.

Some states, sensing the problems of their municipalities, are actively cooperating with their communities. Of all essential aids, money still holds first place. New York, Michigan and California provide grant funds on a matching basis to their urban governments for the completion of public works plans. Engineering surveys, designs and the final blueprints and specifications take time and money. Our citites either do not recognize the necessity, or are reluctant to invest a part of their limited revenues in advance engineering plans. Grant funds from the states on a matching basis provide the incentive to go ahead. The excellent results in New York prove this point.

Some states are probing and analyzing the fiscal ability of their communities and are beginning to realize that all is not well with the municipal revenue structure. While the urban citizens, their commerce and industries, probably pay over 90 per cent of all taxes for the support of all levels of government, their own community needs are all too frequently neglected. In Illinois, for example, the 1942 tax extensions of all municipalities were $22,000,000 less than in 1930. Illinois cities will do well indeed to maintain their reduced service staffs, meet payrolls and pay current bills under their present revenue means, let alone postwar public works planning and construction.

How then can the blueprints be made and construction financed? The average citizen will say, "Why don't you go to the Government? You did it before and you can do it again." He still believes in Santa Claus. To the man on the street a $300,000,000,000

An address presented on Oct. 26, 1944, at the Illinois Chamber of Commerce, Chicago, by Henry B. Bleck, City Engr., Waukegan, Ill.

federal debt is of no immediate concern, *except on pay day*. He has confidence in the resourcefulness and ingenuity of the American people. He recalls the dire warnings of the economists and banking experts when the national debt was $40,000,000,000. Nothing happened! He remembers the ominous prophesies of the same gentlemen when it reached $50,000,000,000 just before the war. Now it is perhaps $300,000,000,000. How much further will it go? He doesn't know or particularly care. Somehow, sometime it will all come out all right. As long as he remains gainfully employed he will have no great concern. And, as long as this nation will provide full employment to the normal labor force of 55,000,000 people, a high national income will be assured and will provide the means for debt retirement.

A high national income is therefore of primary importance. Most people believe it should be over $100,000,000,000 and some estimates run as high as $150,000,000,000. Full employment in business and industry is our only guarantee of that income. Work relief and WPA cannot, and must not, again become a part of our national economy. This, then, should be our objective—full employment, high national income, high receipts and a lower debt.

The construction industry is and will always be an essential part of our national economy. Full employment and prosperity depend upon it. Construction should provide 15 per cent of our national income in the postwar years. History has proved that when the construction volume drops below 12 per cent of the national income, mass unemployment will result. In 1933 the construction volume dropped to 5 per cent. There were 12,700,000 unemployed and the national income fell to $46,500,000,000. As construction increased during the late thirties, unemployment decreased and ended entirely when war construction became effective. The construction industry should therefore provide 15 per cent of our national income. If that income is $100,000,000,000, the total construction volume should aggregate $15,000,000,000 a year. We would like to see all of that construction privately financed and built, but that will hardly be the case. In normal years the volume of private construction will average about two-thirds of the total, which, in the postwar years, would be about $10,000,000,000.

Government at all levels will therefore be confronted with the planning and construction of a $5,000,000,000 public works program, more or less, depending on the fluctuations in economic conditions and the resulting need for public works to stabilize employment.

The responsibility of providing full employment to 55,000,000 people, including 12,000,000 dependent on the construction industry, is the joint responsibility of business, industry and government. If we fail in that responsibility, we will again have to accept work relief and WPA as the inevitable and disastrous consequence.

Adequate public works programs, aggregating $5,000,000,000 a year, must therefore be ready for contract and construction if we are going to stabilize employment and insure the $100,000,000,000 or more national income so essential to our economy.

How will this $5,000,000,000 public works program be divided among the several levels of government? What part, specifically, will our cities have to

provide? How well are we prepared; first, to complete the engineering designs and blueprints and secondly, to finance the cost of construction?

Federal, state and county projects may reasonably be assumed to provide two-thirds of the volume of public construction, leaving one-third or about one and three-quarter billion dollars a year to be planned and built by the municipalities. Translated to a per capita basis this expenditure will approximate $20 a year. Accordingly, in a city of 10,000 population the public works program should total $200,000 a year; in a city of 50,000 people, $1,000,000.

The kind of public works to be considered for municipal construction will of course depend on the needs of each community. From the financial standpoint the most desirable are the revenue producing or self-liquidating projects. As a general proposition those improvements add to the safety, security, health and convenience of the community without appreciable increase in the annual operating and maintenance costs.

There should be no difficulty for any city to prepare a list of necessary public works projects of the magnitude required to meet its pro rata share of the $1,750,000,000 municipal public works construction objective. This, as stated before, will amount to an expenditure of $20 a person each year. In Waukegan, a city of 35,000 population, the public improvement program should total $700,000 a year. There is no difficulty at all in preparing a list of public works projects of this magnitude. The real difficulty is met in securing the funds for planning and in the even greater problem of financing the construction with local revenues. Our people have become so accustomed to getting things for nothing from the government that many of our citizens are still diseased with "grant" fever. They are always willing to spend the other fellow's money. They expect no end to the golden flow from Washington and they do not want to hear the disturbing news to put their financial structure in order and pay for the community needs with community funds.

There was a time in the brighter past when our citizens vied with one another for priority in the matter of local improvements. They all sought to spend their money first. How times have changed and through the years the people have permitted the decay of their local government revenue structure to a point where it is impotent to carry out effectively essential community services. Part of the blame can be laid to the public and part to the elected city and township officials, the county board of supervisors and the state legislature.

While state and federal taxes are increasing, local tax receipts have diminished. I have yet to find a candidate for city office who doesn't advocate a needed expansion in the community services and in the same breath, a reduction in local taxation. And so, successful candidates have to make good on at least the tax reductions. It hasn't been much, but year after year a little has been whittled away from city revenues. Over and above all, the desire for another term also burns with real intensity in the heart of an alderman.

The township assessor, often elected on his pledge to reduce property values for lower local taxation, is supposed to assess all property on the basis of its fair market value. Instead, he frequently yields to the impulse of being

a good fellow with the voters at the expense of the community government, the schools and essential city services. The nasty practice of lateral cuts in the tax valuations during the depression years was all too often duplicated by the county boards of review. The primary function of this board is to equalize tax valuations throughout the county. They wanted to be good fellows too, because they had an election coming up. So when the township assessor made a lateral cut of 10 per cent in the assessed valuations, they called him a "piker" and ordered an additional reduction of 15 per cent. In the meantime the local tax rates remained frozen under the laws of the state. As a result, the tax valuation base now varies in all of the 102 counties of the state of Illinois. The valuations range from full value in Cook County to as low as 22 per cent in Lake County, notwithstanding the requirement of the state law for assessments at full fair market value. This is the No. 1 tax muddle of the state of Illinois and over which local community governments have no control whatever. The conduct of municipal government is always subject to the "tender" mercies of these officials who have no responsibilities to the public for the operation of local government services and still exercise arbitrary power to determine their success or failure. The correction of this evil will be the first great step forward to an intelligent approach to the postwar problems and public works plans of our cities.

There is an imperative need for amendment of the Local Improvement Act to provide again the practical means for constructing local improvements. The present statute has become inoperative because of the absence of adequate protection to the potential purchasers of the bonds.

The authority should be granted to municipalities to accumulate reasonable unexpended corporate fund balances. Under existing state laws the cities are forced to operate under deficit financing. Theoretically, they are supposed to begin each fiscal year with an empty cash drawer and most cities are obliged to operate on borrowed money. The recollection of seemingly interminable payless pay days during the depression thirties, the drastic and unreasonable pay cuts and the schemes for borrowing grocery money will live in the memory of all city employees. They have not shared proportionately in the general rise in wages and they don't want to repeat past experiences.

There are 271 cities, 26 towns and 847 villages in the state of Illinois, representing three-quarters of the entire population. The smaller communities either do not have the means to engage outside engineering services or maintain an engineering staff for postwar planning preparation. In many of the cities which employ a full-time city engineer, his staff is a one-man proposition—himself. Our mayors and city councils will not give thought to financing the costs of advance engineering plans unless public sentiment demands it. As has been demonstrated in Michigan, California and New York, state grants to the municipalities on a matching basis for postwar planning provide the necessary incentive to action. The Illinois State Postwar Planning Commission is considering this proposal and the Illinois Municipal League is urging its endorsement by the public.

A $5,000,000 state appropriation for municipal postwar planning grants on

an equitable matching basis will provide the necessary funds to complete the blueprints and specifications of a two-year state-wide municipal program.

The author does not wish to be accused of suggesting a raid on the accumulated surplus in the state treasury, which may be well over the $100,000,000 mark at this time, with more coming in each month. The state government is to be complimented for its forethought and management in accumulating this surplus. The desire to reserve these funds for state projects and state use is appreciated. However, the revenue responsible for this enviable record was derived primarily from the collection of the 2 per cent Sales Tax paid, by and large, by the people of the municipalities.

It may be significant to observe that the total Sales Tax returned to the state last year by the merchants of Waukegan was approximately $480,000. In the same year, the revenue of the city for all city purposes, except schools and parks, was less than $450,000. The city, therefore, collected $30,000 a year less from all forms of municipal taxation, fees and licenses than the state received from one tax.

In the author's opinion, equity and fairness to the urban population demand the return of a reasonable percentage of future sales tax collections to the municipalities of the state in the same manner as was finally enacted for the redistribution of the Motor Fuel Tax collections.

In the immediate postwar years such Sales Tax refunds to cities should be ear-marked for public works construction. If the amount would only be equivalent to the Sales Tax paid by city residents on food, it would be a material help in financing city projects.

The urban citizens cannot live off the land. Practically all they consume in food, averaging $150 a year for each person, is subject to the Sales Tax, and to this extent they are penalized over the rural population. The food tax paid by the municipal resident will average $3.00 a year and certainly a city government is at least entitled to this refund.

May we, therefore, plan for the future with intelligent thought, bearing in mind always, our joint and individual responsibilities to maintain full employment, a high national income, high receipts and lower national debt. Should we fail in this duty and beget mass unemployment, the situation then becomes one of national concern.

A public works program well conceived, well planned and well constructed by all levels of government, can and will play an important part in preserving our economy and the American Way of Life.

# War Production Board—Office of War Utilities

## *Revisions of November 15, 1944*

As of November 15, 1944, the U-1 series of orders and the Housing Utilities Standards were amended. This entire series of orders as amended August 31, 1944, was published in the October JOURNAL (pp. 1123–1143). In the interest of paper conservation, the orders as amended will not be reprinted in entirety, but only by quotation of new paragraphs having special interest to water works executives.

Utilities Order U-1 has been amended for the principal purpose of removing the restrictions on inventory and deliveries with respect to war surplus materials. Changes have been made in the Housing Utilities Standards and in the applicable Supplementary Utilities Orders to modify the restrictions on construction of extensions by water, gas and central steam heating utilities. Minor changes have also been made to conform with the language of other WPB orders and regulations.

### *Utilities Order U-1*

Inventory and delivery restrictions on war surplus materials have been removed by including, in paragraph (a) (11), "war surplus materials purchased" among the kinds of materials which may be excluded from inventory and which are, therefore, not subject to the delivery restrictions of paragraph (e). War surplus materials are defined in a new subparagraph (a) (13). ("War surplus materials" means material designated as surplus to the war effort and offered for sale by any Federal government agency having jurisdiction over their disposal.") It should be noted that the restrictions on the use of material in paragraphs (h) and (i) of the order are still applicable to war surplus materials on the same basis as to other material. Therefore, construction projects requiring authorization on Form WPB-2774 must be filed with the Office of War Utilities even though it is proposed to use war surplus materials in the construction.

Paragraph (i) (5) has been amended to *remove* the requirement that the construction or alteration of buildings comply with paragraph (e) of Schedule A to CMP Regulation 6, as to structural design. It has been found that this requirement was generally inapplicable to minor plant additions.

### *Order U-1-d and Housing Utilities Standards*

The restrictions of U-1-d, paragraphs (b)(1) and (b)(3), are made applicable only to extensions of electric service. The entire section of the Housing Utilities Standards restricting the length of extension per dwelling unit for water and gas utilities and imposing special provisions governing the use of copper and copper-base alloy pipe and tubing has been deleted. (The deleted requirements appeared on page 1139 of the October JOURNAL. All the text in column 1 on that page below the heading "Standards for Water and Gas Facilities" has been removed from the Standards.)

### *Order U-1-f*

The restrictions of the Utilities Construction Standards are no longer made applicable to extensions of water, gas and central steam heating facilities. This change has been made by modification of the wording of paragraph (b)(2), which is now applicable only to electric extensions, by the deletion of Section B.I.1.b. (See page 1143, October JOURNAL) of the Utilities Construction Standards and by other minor changes in these standards.

The restrictions of Order U-1-f with respect to the use of copper and copper-base alloy pipe or tubing have been revoked. This action is being taken to parallel a modification of the restrictions contained in Conservation Orders M-9-c and M-9-c-4 relating, respectively, to the manufacture and use of these materials. It has been determined by the War Production Board to permit the manufacture, distribution and use of new copper and copper-base alloy pipe and tubing to a limited extent. This change will be of particular interest to water utilities who find an economical use for this material in extensions of services. The amount of this material released for manufacture should be adequate for utilities' needs if proper restraint is exercised by utilities in placing their orders. *Utilities are requested in ordering this material to restrict their purchases to no more than sixty days' requirements.*

Section (b)(2)(iii) of Order M-9-c-4 as amended Nov. 13, 1944, reads as follows: "Copper or copper-base alloy pipe and tubing may be connected to a water supply or distribution system if the pipe or tubing is to be used both *underground and outside* of a building."

On the same day, Order M-9-c was amended to remove the restrictions against manufacture of copper tubing or pipe for underground water service.

It must be noted that use of copper tubing is permitted in water lines *underground* and *outside* of a building. This clears up the problem of copper service lines. It must not be confused with the use of copper in buildings. Water works executives' interest in such use of copper is secondary, but they should keep the distinction sharply in mind. (It is assumed that copper service tubing or pipe can project far enough inside a building foundation for a fitting to be attached for connection to other types of pipe. But fair play will limit this use of copper to a minimum—certainly not more than 6 in.—*Editor's note.*)

### *Summary of Changes in the Supplementary Orders*

The above changes will remove all of the restrictions on the length of extensions made by water, gas and central steam heating utilities. The restrictions which remain as to such extensions are:

(a) The net material cost of the extension must not exceed $10,000.

(b) The extension must not duplicate an adequate service of the same type already installed or constitute a standby service.

(c) In accordance with paragraph (i)(3), the extension must be necessary for rendering service at minimum standards.

(d) In accordance with paragraph (i)(2), design must be economical of manpower and material and utilize plentiful rather than scarce material.

(e) In the case of gas service the restrictions of Orders U-7 and L-174 are still applicable.

(f) In the case of extensions under U-1-d, the producer must furnish completed Form WPB-3348 to the builder for filing with the builder's application under L-41.

These statements paraphrase in part the Administrative Letter dated November 15, issued by Edward Falck, Director of the Office of War Utilities. Quoted sections of the various orders are verbatim. Complete copies of all orders can be obtained upon request from the War Production Board.

**Since the changes in policy announced by the Office of War Utilities on Nov. 15, 1944, a striking increase in the demands for war materials has occurred. Water works men must anticipate that their purchase and use of copper-bearing materials will be subjected to constant scrutiny. It may become necessary to restrict, to a degree not presently reported, the use of copper water service tubing. Any water works executive who may find himself disturbed over such restrictions should look twice at the gold stars in his neighbor's window before he complains.**

## Renegotiation of Water Bills

Under the basic terms of the Renegotiation Act, contracts for services rendered in the production of war materials are subject to review and adjustment by the "Price Adjustment Board." Utility services are included in the items subject to renegotiation but such services rendered by a publicly-owned agency are exempt. Thus bills for water sold to a war producer by a municipally-owned plant are not subject to review, but such bills if rendered by a privately-owned water utility may be reviewed. Prior references to this matter appeared in this JOURNAL (**36**: 644 and **36**: 908 (1944)).

The *Federal Register* of June 7, 1944, contained certain regulations related to *exemption* from renegotiation of electric, gas and transportation charges up to a certain amount. In the case of electric power, contracts for delivery of less than 1,000 kilowatts of contractual demand were exempt. For gas, the exemption extended up to $50,000 per year billing. Transportation and communications (telephone, telegraph, radio, etc.) were exempted when such charges were approved and subject to regulation by a public regulatory body.

For no reason that has ever been offered by persons related to the matter, water service was not included in the exempt list. The matter was brought to the attention of the Office of War Utilities and through the co-operation of Edward W. Falck, Director of the Office of War Utilities, the addition of water service to the exemption list was obtained. As the matter was presented, an exemption equal to that granted the gas industry was requested, namely $50,000 per year. In the regulations which follow, the exemption was set at $10,000 per year.

It must be admitted that the reasoning involved in the levels of exemptions granted the various utility services is hard to appraise. If there is good reason to exempt all transportation and communication charges when "approved or subject to regulation by a public regulatory body" then charges for water, gas and electricity furnished by private utilities which are almost universally subjected to control by regulatory bodies, should be exempted for the same good reasons. Similarly if the sale of gas up to $50,000 per year is exempted, what reasoning leads to exemption of a water service at the $10,000 level? Under commission regulation, a water utility selling $50,000 worth of service stands to make no more profit than a gas utility selling the same dollar amount of service.

True, the exemption level set for water service eliminates most of the water sales from renegotiation and to this extent, is useful. How great the remaining problem will be, experience only will reveal.

The added section of the regulations as promulgated on November 19, 1944 follows:

1608.842 *Public Utility Exemption*

(e) *Public Utilities; furnishing of water or removal of sewage.* (1) Pursuant to subsection (i)(4) of the Renegotiation Act of 1943 (including subsection (i)(4)(B) and (i)(4)(F)) the following classes and types of contracts and subcontracts are exempt to the extent provided in this paragraph from all of the provisions of the Renegotiation Act of 1943:

(i) Any contract or subcontract with a public utility for the furnishing of water or the removal of sewage, except that if the amounts received or accrued under any such contract or subcontract during any particular fiscal year were $10,000 or more, amounts received or accrued under such contract or subcontract for such fiscal year shall not be exempt from renegotiation by reason of this subdivision (i). (If such fiscal year is a fractional part of twelve months, the $10,000 amount shall be reduced to the the same fractional part thereof for the purposes of this subdivision (i).)

(ii) Any subcontract with a public utility for the furnishing of water or the removal of sewage without regard to the amounts received or accrued thereunder during any fiscal year, except that:

(a) If such subcontract for water or the removal of sewage is with a contractor having a contract with a Department providing for the reimbursement by a Department of costs of the contractor incurred under such subcontract for water or sewage, or

(b) If a Department has contracted to pay or guarantee the payment of amounts payable under such subcontract for water or the removal of sewage,

then in either such case such subcontract for water or sewage shall not be exempt from renegotiation by reason of this subdivision (ii).

*Nov. 18, 1944*

## 1944 Conference—Milwaukee

In the minds and memories of A.W.W.A. members, Milwaukee will hereafter have an added reason for being famous—its fine co-operation in making the 1944 Conference a substantial success.

The greatest tributes are due to Joseph Schwada and Herbert Brown for their many weeks of intensive planning to provide all the things that make such a meeting go. To Schwada especially (with his co-worker Harry Breimeister) credit is due for his forthright and positive handling of the hotel reservation situation to the end that accommodations were found for all the water works men who decided that they would go to Milwaukee.

The attendance at A.W.W.A. conventions, since the pay-as-you-register plan went into effect, has been as follows:

| Year | City | Total Registered | Year | City | Total Registered |
|---|---|---|---|---|---|
| 1929 | Toronto | 1104 | 1937 | Buffalo | 1140 |
| 1930 | St. Louis | 1021 | 1938 | New Orleans | 1123 |
| 1931 | Pittsburgh | 1076 | 1939 | Atlantic City | 1290 |
| 1932 | Memphis | 712 | 1940 | Kansas City | 1467 |
| 1933 | Chicago | 660 | 1941 | Toronto | 1445 |
| 1934 | New York | 891 | 1942 | Chicago | 1438 |
| 1935 | Cincinnati | 901 | 1943 | Cleveland | 1131 |
| 1936 | Los Angeles | 891 | 1944 | Milwaukee | 1356 |

The Convention Management Committee consisted of:

*Representing the A.W.W.A.*

Wm. J. Orchard, *Chairman*
Samuel F. Newkirk, Jr.
Joseph P. Schwada

*Representing the W.&S.W. Mfrs. Assn.*

Clinton Inglee
Joseph M. Wafer

*Ex-Officio*

Samuel B. Morris, Pres., A.W.W.A.
Harry E. Jordan, Secy., A.W.W.A.
Linn H. Enslow, Chr., Publ. Comm.
Chas. A. McGinnis, Pres., W.&S.W. Mfrs. Assn.
Arthur T. Clark, Secy.-Mgr., W.&S.W. Mfrs. Assn.

Of the men who registered, a larger-than-usual proportion registered for the meetings only and did not attend any of the social events. Only 60 per

cent of the men purchased full registration tickets and the remaining 40 per cent (more than 400) chose their own ways of spending the time after the sessions were over. The record for recent years follows:

| City | Year | All Events *Per cent* | Meetings Only *Per cent* |
|---|---|---|---|
| Buffalo | 1937 | 79 | 21 |
| New Orleans | 1938 | 78 | 22 |
| Atlantic City | 1939 | 66 | 34 |
| Kansas City | 1940 | 68 | 32 |
| Toronto | 1941 | 71 | 29 |
| Chicago | 1942 | 63 | 37 |
| Cleveland | 1943 | 68 | 32 |
| Milwaukee | 1944 | 60 | 40 |

*The Army Engineers* group associated with the maintenance and repair of water supply facilities in Army training centers met in private sessions during the Conference. They were provided with a meeting place for their own sessions and also participated in the Association's technical sessions as fully as they desired.

*Conference Program.* While the technical sessions were related, to the fullest possible extent, to the place of water works in the war, many other matters of current interest were discussed. Edward W. Falck, Director of the Office of War Utilities and Arthur Gorman, Chief of the Water Division, Office of War Utilities, presented the then status of the materials and production situation as it affected water works. E. L. Filby, Field Director of the Committee on Water and Sewage Works Development, reported upon the status of the Committee's work and Messrs. Devendorf, Hunter and Schunke presented discussions of postwar planning in New York, Texas and the Pacific Northwest. A Symposium on Water Works Management was led by Wendell R. LaDue with Messrs. Longwell, Erickson and Moore participating. A Symposium on Wartime Problems of Jointly Administered Water and Sewage Works was led by L. N. Thompson with Messrs. Amiss, LaDue, Myers and Pray participating. One session was devoted to costs and accounting related to water works structures with Messrs. Aldrich, Burdick, Howson and Veatch presenting aspects of the subject. The Water Purification Division held three interesting and largely-attended sessions, one focusing its attention on latest developments in chlorination and the other on water softening. The Committee on Water Works Practice held an open session with a large attendance of members who were interested in specific aspects of water works standardization.

*Entertainment.* Joseph Schwada handled local arrangements for general entertainment and Mrs. Herbert H. Brown handled ladies entertainment; both to the complete satisfaction of all concerned.

*Exhibits.* The Water and Sewage Works Manufacturers Association, through Arthur T. Clark, Secretary-Manager, provided informative exhibits of water works materials in the Milwaukee Auditorium. The exhibits were located on either side of the entrance hall through which all attendants passed to the technical sessions. All available exhibit space was filled.

*Local Transportation.* Co-chairmen Marshall and Schmitt maintained a staff of water department personnel who scheduled trips to points of interest about the Milwaukee water works for all who wished to inspect them. The visiting groups were held to a small number at any hour so that ample guidance could be provided.

*Attendance.* The Milwaukee attendance total was only 111 short of the all-time record of 1467 at Kansas City in 1940. For a war year, this was a remarkable achievement.

*Wisconsin Section.* All members of the A.W.W.A. in Wisconsin participated in the planning and handling of the Conference. The Committee Chairmen and Co-chairmen were:

| | |
|---|---|
| Local Convention Committee | Joseph P. Schwada<br>Leon A. Smith |
| Local Host Committee | Daniel W. Mead, *Honorary Chairman*<br>Herbert H. Brown<br>H. P. Binder<br>Harold L. Londo |
| Local Transportation Committee | W. B. Marshall<br>H. C. Schmitt |
| Presidents Reception and Dance | Mr. & Mrs. James E. Kerslake<br>Mr. & Mrs. A. P. Kuranz |
| Dinner-Dance | Mr. & Mrs. J. E. Johnston<br>Mr. & Mrs. Walter A. Peirce |
| Ladies' Sub-committee on Entertainment | Mrs. Herbert H. Brown |
| Ladies' Hostess Committee | Mrs. Harold L. Londo<br>Mrs. Leon A. Smith |
| Ladies' Tea Committee | Mrs. Norton Thomas<br>Mrs. Walter Windfelder |
| Ladies' Luncheon and Tour Committee | Mrs. H. P. Binder<br>Mrs. James E. Kerslake |
| Ladies' Luncheon and Bridge Committee | Mrs. Joseph P. Schwada<br>Mrs. Frank Stich |

## Presentation of Awards

*Honorary Membership* was conferred upon Messrs. Charles Baker Burdick, Frank Eugene Hale and Thomas Hollis Wiggin. The citations were:

*Charles Baker Burdick,* Consulting Engineer of Chicago. A member of the Association since 1907. An engineer of distinction who professionally has contributed greatly to the economic development and administration of public water supplies in many cities and thus to the comfort and safety of urban living.

*Frank Eugene Hale,* Director of Laboratories of the Water Department of New York City. A member of the Association since 1908. Recipient of the Goodell Prize in 1935. Distinguished for his research and practice in the field of water examination and for his many contributions to the literature of water quality control.

*Thomas Hollis Wiggin,* Consulting Engineer of New York. A member of the Association since 1922. Recipient of the Goodell Prize in 1940. Leader of the Committee on Standardization of Cast-Iron Pipe and through this work contributor to the safety of all water users and to the lengthened useful life of water works distribution systems.

*The John M. Diven Medal,* annually awarded to the member whose services to the Association are deemed most outstanding, was presented to Louis R. Howson, with the following citation:

*Louis R. Howson* for his many services and valuable contributions to the advancement of the water works field, particularly for his leadership of the Committee on Elevated Tanks and Steel Standpipes, and the development by the Committee during 1943 of the "Recommended Practice for Repainting Elevated Steel Tanks," which has greatly aided in lessening sharp practices in this field. Recognition is also given to his leadership of the A.W.W.A. Committee on Wartime Activities, as well as the Joint Committee on Survival and Retirement Experiences With Water Works Facilities. Along with all these efficiently administered tasks, he has found time to record valuable personal experiences for the guidance of men in the water works field in many papers delivered at A.W.W.A. General and Section meetings.

*The John M. Goodell Award,* for the best paper published in the JOURNAL of the Association, was presented to:

*Noel S. Chamberlin* and *John R. Glass* for their papers on the subject of "Colorimetric Determination of Chlorine Residuals," which appeared in the

August and September 1943 issues of the JOURNAL. In these papers the authors have reviewed in detail the chemistry of color production with ortho-tolidine in the presence of chlorine; have studied spectrophotometrically the colors produced; and have prepared revised formulas for chlorine determination standards. The papers represent a material contribution to the methods available to water works chemists and engineers which insure the efficiency of water treatment processes where the use of chlorine is involved.

*George W. Fuller Memorial Award* certificates were presented to the following members:

California Section—*George Wesley Pracy:* In recognition of his outstanding work in the development of standards for pipeline and service materials; his valuable contribution to metering and meter testing problems; and his unselfish services to the Association and the California Section.

Canadian Section—*William Storrie:* For distinguished service and engineering skill in the field of water supply, for constructive leadership and many contributions to the activities of the Canadian Section.

Florida Section—*Frederic Arnold Eidsness:* For his outstanding service to the water plants of Florida and especially to the water works operators through his efforts in forwarding the voluntary certification plan; and for his very successful planning and co-ordination of the Short School at West Palm Beach.

Four States Section—*Levi Larndon Hedgepeth:* For contributions over many years of continuous research in the applications of chemicals to water purification, advancement of operating safety and untiring work for the Association in the formulation of programs of general benefit.

Illinois Section—*Winfred Dean Gerber:* Past Secretary and Chairman of the Illinois Section, who, through his efficient handling of the many assignments given him and his keen understanding of human nature, has contributed much to the Illinois Section and the personal relationships of its members.

Indiana Section—*Edward Francis Kinney:* For outstanding loyalty to the Section and the Association, for continuous effort in membership building, for unselfish participation in short schools and district meetings, and especially for service far beyond that expected in time of disaster.

Michigan Section—*Louis Benjamin Harrison:* For his outstanding work on taste and odor control, and for his interest and active leadership over a period of many years in the promotion of the water works profession in Michigan.

Missouri Valley Section—*Daniel Howard Rupp:* For his outstanding achievements in connection with operating problems related to water purification

and water softening and for valuable services on Association committees assigned to that subject.

Montana Section—*David Shon Thomas:* In recognition of his outstanding ability and character and of those qualities of earnest study and careful analysis so essential to clear thinking and needful evaluation; and for his long-term and valuable services to the Section.

New Jersey Section—*Attmore Edwin Griffin:* For his contributions to research in safeguarding water supplies by chlorination, particularly the development and application of break-point chlorination; and his many services to the New Jersey Section.

New York Section—*Ernest John Rowe:* For his pioneer leadership in stimulating group meetings of water works officials and his unstinting assistance to neighboring water works officials, exemplifying group action during the war period in relation to the Mutual Aid Program for Water Supply Service.

North Carolina Section—*William McKinney Piatt:* In recognition of his sound engineering skill and successful achievements in the field of water purification and distribution over a period of more than forty years, and for his tireless efforts in behalf of the North Carolina Section since its organization in 1921.

Ohio Section—*Philip Burgess:* Who, since 1911, by his personal initiative as an engineer, his faithful stewardship in public appointments, his unselfish contributions in the Association's committee work and his conscientious attitude toward his clients, has upheld the ideals of the water works profession.

Pacific Northwest Section—*Fred Merryfield:* For his tireless and unselfish efforts in promoting the welfare of the Pacific Northwest Section, his readiness to give of his ability invaluable service to his fellow members in the better understanding of the principles of the Association.

Rocky Mountain Section—*Dwight David Gross:* In recognition of his faithful services toward the advancement of the Rocky Mountain Section, where he has held office as Trustee and President and has always responded willingly and efficiently when asked to participate in the Section meeting programs.

Southeastern Section—*Fletcher King Ellis:* In recognition of his outstanding services to the water works profession in the southeastern states, particularly his activities in South Carolina relating to training schools and certification of water plant operators; and for his research and development of ground-water supplies.

Southwest Section—*Leslie Allerton Jackson:* For his efficient and successful organization and administration of the water department of the state's largest

city; his outstanding leadership of the Section in promoting Association membership and furthering its educational program through the promotion of water works schools; and for his valuable contributions to the Southwest Water Works Journal.

Virginia Section—*Robert Cousins Bardwell:* In recognition of his exceptional activity and leadership in the affairs of the Virginia Section; also his valuable contribution to the water works field, particularly in connection with railway water supplies.

Western Pennsylvania Section—*John Needels Chester:* For his outstanding ability as organizer, constructor, designer, operator and owner of water works and his long-term leadership in water works activities.

West Virginia Section—*Joseph Kerr Buchanan:* In recognition of his continued interest in the West Virginia Section meetings from their inception, his outstanding ability as an executive, his leadership in water works utilities and inspiration to all of these meetings with his geniality.

Wisconsin Section—*Herbert Henry Brown* and *Joseph Philip Schwada:* For promotion, design, construction and operation of the Milwaukee Filtration Plant and for their active and loyal participation in the affairs of the Wisconsin Section.

No Fuller Memorial Awards were made by the Cuban, Kentucky-Tennessee, Minnesota and New England Sections during the last Association year.

*The Nicholas S. Hill Cup,* awarded annually to the Section having the greatest percentage gain in membership from one general meeting to the next, was won by the Florida Section. Its point score was 48.08. Second and third, respectively, were the Southwest Section (point score 40.68) and the Virginia Section (point score 34.63).

*The Henshaw Cup,* awarded annually to the Section having present at its annual meeting the greatest percentage of its membership, was won by the Minnesota Section. At its 1943 meeting, 69.06 per cent of its membership attended. Second and third, respectively, were the Montana Section (62.26 per cent) and the Pacific Northwest Section (55.85 per cent).

*The Old Oaken Bucket* remains in the possession of the California Section. This conference was the sixth at which the award for top section membership has been made, and the sixth time that the California Section (644 members) received the award.

# Schedule of Conference Papers and Reports

### Plant Management & Operation Division—2:00 P.M.—June 13, 1944

The Design and Construction of the Milwaukee Water Works System..Joseph P. Schwada
The Operation and Maintenance of the Milwaukee Water Works System.....
Herbert H. Brown
Development of Centrifugal Pump Discharge Valve Control at Milwaukee's Riverside Pumping Station.....H. B. Hoefer
Practical Studies of Distribution Systems.....George W. Booth

### Water Purification Division—2:00 P.M.—June 13, 1944

Experiences With Break-Point Chlorination.....C. D. Adams
Practical Use of the Ortho-tolidine-Arsenite Test for Residual Chlorine.....
F. W. Gilcreas and F. J. Hallinan
Discussion.....A. E. Griffin and L. J. Alexander
The Mechanism of Destruction of Micro-organisms in Water by Chlorine and Chloramine..
S. L. Chang

### General Session—9:30 A.M.—June 14, 1944

A Review of the Cost of Water Works Structures.....Charles B. Burdick
Survival and Retirement Experience With Water Works Structures—*A Committee Report*
E. H. Aldrich
Municipal Depreciation Accounting Practices.....N. T. Veatch
Dollars and Sense of Depreciation.....Louis R. Howson

### Water Purification Division—9:30 A.M.—June 14, 1944

The Bacteria in the Distribution System.....A. M. Shannon and W. M. Wallace
Influence of Various Chemicals on Palatability of Drinking Water.....
J. W. Hassler and Martin Faye
Permissible Loadings and Capacities of Water Treatment Plants—*A Committee Report*.....
Douglas Feben
A Consolidated Coliometer for Streamlined Water Bacteriology.....A. A. Hirsch

### Water Purification Division—2:00 P.M.—June 14, 1944

The Economics of a De-Ionized Water Supply.....Frank Bachmann
Diatomite Water Filtration Developed for Field Troops.....
Hayse H. Black and Charles H. Spaulding
Calcining Sludge From a Water Softening Plant.....H. V. Pedersen
Recovery of Calcium Carbonate or Lime From Water Softening Sludges.....
Robert T. Sheen and H. B. Lammers
Discussion.....C. W. Gordon and F. G. Nelson

**Special Session—Postwar Planning—8:30 P.M.—June 14, 1944**

Planning for Postwar Construction.....William N. Carey
Program and Policies of Office of War Utilities.....Edward Falck
Labor Organization in the Professional and Municipal Field.....A. M. Rawn

**General Session—9:30 A.M.—June 15, 1944**

Financing and Constructing Inter-System Connections.....
N. L. Nussbaumer and H. T. Critchlow
Metropolitan Water Supply Developments.....Samuel B. Morris
Program and Policies of Water Division of OWU.....Arthur E. Gorman
The Legal Limits of a Water Supply System.....John H. Murdoch Jr.
Discussion.....Boyd A. Bennett

# Papers Scheduled at Section Meetings

THERE follows a summary-listing of papers scheduled for presentation at Section Meetings during 1944. The dates of the Section Meetings from 1940–44 and locations for 1944 are given on page 1401. A record of membership totals at the time of, and attendance at, the meetings in 1940–44 is presented on page 1402. Section officers who were elected at meetings held during 1944 and who will be holding office on January 1, 1945, are listed on page 41 of this JOURNAL. The listing that follows is chronological and not alphabetical by Sections.

### New Jersey Section—Winter Meeting—Scheduled Papers—February 10, 1944

Safety as It Pertains to Water Works Construction.....Fred Eitel
Demonstration of the Sea Water Desalting Kit.....W. H. Reed

### Minnesota Section—Scheduled Papers—March 16–17, 1944

Health and the Cycle of Water.....*A Motion Picture*
Panel Discussion:
Pump Maintenance.....Harry Stock
Meter Maintenance.....George Roden
Distribution System.....Carl W. Seemann
Address of Welcome.....*Mayor* John J. McDonough
Water Softening by Split Treatment.....Donald Walker
The Public and Its Water Supply.....J. Arthur Jensen
Treatment of Surface and Ground Waters in Minnesota and Vicinity.....M. H. Bischoff
Discussion.....L. H. Coult and O. C. Ayliffe
Stabilization of Softened Water.....Wm. Yegen
New U.S.P.H.S. Standards for Drinking Water.....C. T. Butterfield
Some Hydrologic Characteristics of the Aquifers of Minnesota.....Geo. A. Thiel
Taste and Odor Control.....John B. Harris

### Illinois Section—Scheduled Papers—April 11–13, 1944

Better Laboratory Control of Public Water Supplies.....E. S. Clark
Corrosion of Well Pumps.....T. E. Larson
Discussion.....R. E. Coughlan and H. V. Bowlby
Spiractor Installation at Teutopolis.....M. E. Gilwood and T. N. Rimbach
Ground-Water Levels.....J. J. Woltman
Committee Report on Ground-Water Conservation.....L. R. Howson
Peoria Plan for Human Rehabilitation.....Harold Vonachen
Supervision of Utilities in Wisconsin.....P. A. Reynolds

Quality of Water in Distribution Systems.....John R. Baylis
Wartime Problems.....John A. Goetz
Blueprint Now.....E. L. Filby
Association Affairs.....Samuel B. Morris
Operation of Water Supply at Camp Ellis.....Chester A. Miller
WPB Regulations.....F. H. Weed
Conservation Program and Future Prospects From the Water Works Standpoint.....
H. Lloyd Nelson

**Indiana Section—Scheduled Papers—April 13–14, 1944**

Experiences During the 1943 Floods—*A Symposium*.....
F. M. Hartman, Floyd L. Kerns, Carl Larrison, Glen Garman, W. H. Durbin, C. A. Robbins and Leo Louis
Control of Taste, Red Water and Bacterial Aftergrowth in the Distribution System.....
A. E. Griffin
Depreciation—Fact or Theory.....L. R. Howson
A.W.W.A. Wartime Service to the Water Works Industry.....Samuel B. Morris
Power for War.....L. B. Schiesz
Lessons From the Recent Northern Indiana Typhoid Fever Epidemic.....Thurman B. Rice
Why License Water Works Operators?.....P. S. Sikes
Wartime Plant Maintenance and Water Conservation.....F. H. Weed
Stream Pollution as It Affects Indiana Public Water Supplies.....Joseph L. Quinn
New Water-Borne Disease Hazards of the Postwar Period.....Don E. Bloodgood
Information, Please.....*Led by* H. W. Niemeyer
Blueprint Now.....E. L. Filby
Postwar Planning for Water Works and Sewerage Developments.....Raymond Pike
Discussion.....George A. Kuhn
Construction of New Indianapolis Impounding Reservoir (*A colored motion picture*).....
W. C. Mabee

**Canadian Section—Scheduled Papers—April 19–21, 1944**

Conservation and Water Supply.....A. F. Coventry
Geological Aspects of Canada's Ground-Water Resources.....B. R. McKay
Postwar Water and Sewerage Programs.....E. L. Filby
Guided Discussion—Plans for Postwar Programs.....*Led by* J. W. Peart
Dental Caries and Water Supplies.....Harold K. Box and H. T. Hodgins
Guided Discussion—Conservation of Water.....*Led by* C. J. DesBaillets
General Discussion—Problems of Public Utilities...*Led by* O. H. Scott and Ira P. Macnab
Water Works Distribution Systems.....W. D. Hurst
Foot Valves on Centrifugal Pumps.....R. W. Angus
Guided Discussion—Frost Control in Water Works Systems.....*Led by* W. E. MacDonald

**Michigan Section—Scheduled Papers—April 26–28, 1944**

Address of Welcome.....*Mayor* D. J. Hackett
News From the Field.....Raymond J. Faust
Stream Pollution in Relation to Public Water Supplies.....Milton J. Adams
General Discussion—Postwar Projects:
Planning.....John J. Hepler
Blueprint Now.....E. L. Filby
State Assistance in Engineering Design and Planning.....Adrian Langius
New York City Financing.....Richard A. Sullivan

Rate Structures.....Louis E. Ayres
Air Conditioning.....R. L. McNamee
Fluorine and Dental Decay.....C. Ray Taylor
Retirement Plan for Municipal Employees.....A. G. Gabriel
Water Conservation and New U-1 Order.....F. H. Weed
Iron Removal and Red Water Problems.....T. L. Vander Velde
Economic Benefits of Water Softening.....Harrison H. Caswell
Report on Water Laboratories Technical Procedure.....Percy M. Phelps
Calculation of Alkalinities and Free Carbon Dioxide in Water by Use of Nomograph.....
John Dye
Discussion of New State Report.....Raymond J. Faust

**New York Section—Spring Meeting—Scheduled Papers—April 27–28, 1944**

Address of Welcome.....*Mayor* J. Bradbury German
The Rome Water Supply.....G. Lyle Stillman
WPB and the Water Production Business.....Bayard F. Snow
Panel Discussion—Municipal Postwar Planning.....
*Led by* E. T. Cranch, Holden A. Evans Jr. and Earl Devendorf
Hydraulic Bookkeeping.....Louis Mitchell
Utilization of Ground Waters in Postwar Program.....H. Howard Cranston
Demonstration of Sea Water Desalting Kit.....F. D. West
Superintendents' Round Table Discussion.....*Led by* A. A. Korves

**Montana Section—Scheduled Papers—May 5–6, 1944**

Address of Welcome.....*Mayor* H. B. Landoe
Response.....J. M. Schmit
Address.....Samuel B. Morris
Address.....A. E. Heath
Profitable Failures in Health Work.....W. F. Cogswell
More Action and Less Talk.....*Gov.* S. C. Ford
In Respect to Postwar Planning.....E. L. Filby
Report of Committee on Postwar Planning.....D. S. Thomas
Investigation of Montana Stream Pollution Problems.....W. M. Cobleigh
The United States Public Health Service Standards.....B. D. Baker
The Features of the Physical Plant.....W. M. Cobleigh
The Chemical Quality.....Stewart Voden
The Bacteriological Quality.....H. B. Foote
War Production Board Regulations Affecting Public Water Supplies.....G. E. Arnold
The Bozeman City Water Supply System.....Fred Quinnell

**Southeastern Section—Scheduled Papers—May 8–10, 1944**

Address of Welcome.....*Mayor* C. F. McCullough
Response.....J. L. Hawkins
Chemical Characteristics of Public Water Supplies in the Southeastern States..W. L. Lamar
Development of Ground-Water Supplies.....W. S. Beiser
Maintenance of Electric Motors.....D. G. Sudderth Jr.
U.S. Army Water Standards.....V. Bruce Sundstrom
Modern Water Plant Design.....H. F. Wiedeman
Blueprint Now or Boondoggle Tomorrow (The Tale of Two Cities).....Harry E. Jordan
Plant Maintenance and Conservation.....W. L. Picton
Meters—The Great American Cash Register.....Charles Bachmann

**New Jersey Section—Spring Meeting—Scheduled Papers—May 11, 1944**

U.S. Dollars at Work in South America.....Edward J. Cleary
The New Jersey Ship Canal as It May Affect Water Supplies.....Charles Capen

**Pacific Northwest Section—Scheduled Papers—May 12–13, 1944**

Address of Welcome.....*Mayor* J. T. Trullinger
Response.....W. C. Morse
Symposium—War and Postwar Water Works Construction:
War Production Board Policies and Procedures.....Arthur E. Gorman
Pacific Northwest Water Utility Problems in Wartime.....G. E. Arnold
Plans for Postwar Water Works and Sewerage Construction.....E. L. Filby
Symposium—Water Quality:
The Relation of Runoff and Water Quality to Land and Forest Use:
The Cedar River Watershed.....Bror L. Grondal
The Green River Watershed.....W. A. Kunigk
Water-Borne Outbreak in an Oregon Shipyard.....R. E. Dodson Jr.
The Effect of Underground Disposal of Sewage on Ground Water.....
H. C. Clare and M. S. Campbell
Symposium—Water Works Structures and Pipelines:
Pumping Equipment: Its Design, Operation and Maintenance.....J. A. Greenland
Water Hammer and Its Control in Water Works Systems.....J. C. Stevens
Ventilation of Water Works Structures.....Irene Melbo
Water Supply Problems in the South Pacific Area.....Fred Merryfield
Designing Transmission Pipelines for Long Life.....W. C. Morse
Protective Coatings and Paints for Water Works Structures.....Delmar Brown
Construction of the "Big Inch" Pipeline.....*A Motion Picture*

**Ohio Section—Scheduled Papers—May 18–19, 1944**

Address of Welcome.....*Mayor* James A. Rhodes
Response.....Harvey P. Jones
Round Table Discussion—Operation Problems of Small Water Works.*Led by* T. R. Lathrop
The State of A.W.W.A. .....Samuel F. Newkirk Jr.
Specific Examples of Municipal Water Supply Planning—Good, Bad and Indifferent.....
F. H. Waring
The Work of the Ohio Water Supply Board.....David H. Harker
Surface Water Resources of Ohio.....C. V. Youngquist
Across the Desk!
A Peddler Looks at Superintendents—Salesman Sam
A Superintendent Looks at Peddlers—John Gildersleeve
Lime-Soda Softening Sludge Disposal at the Wright Aeronautical Corporation, Cincinnati
Robert T. Sheen and Herbert B. Lammers
Distribution Records.....Russell S. Banks
Trend in Design of Steam Power Plants.....S. C. Simmermacher
Plant Management and Water Conservation.....F. H. Weed
Effect of the War on the Operation of the Toledo Water Works.....
R. W. Furman, Edwin R. Barrett, Ernest Townsend and Joseph Jankowski
Break-point Chlorination Control and Operation.....A. E. Griffin
Blueprint Now .....E. L. Filby
"Information Please".....*Led by* Wendell R. LaDue

**Rocky Mountain Section—Scheduled Papers—September 20–22, 1944**

Address of Welcome.....Frank C. Hill
Symposium—Justifiable Treatment of Sewage..B. V. Howe, R. F. Poston and C. T. Wright
Rural Sanitation.....W. V. Leonard
Grease Removal.....Donald Walker
Grease Rendering at Sewage Plants.....C. P. Gunson
Round Table Discussions:
Sewer Operations as an Aid to Sewage Treatment
Operation of Sewage Treatment Plants
Design and Operation of Trickling Filters
Effect of Pre-floculation on Sedimentation
*Led by* C. H. Coberly, Dana E. Kepner, John T. Franks, F. M. Veatch and E. B. Besselievre
Address of Welcome.....*Gov.* John H. Vivian
Response and Chairman's Address.....G. J. Turre
The Design and Construction of a Water Collection and Transmission System.....*A Motion Picture*
Postwar Planning.....Elroy Nelson
Recent Advances in Chlorination of Water.....John Strang
Relationship Between Bacterial Analysis and the Quality of Water.....W. V. Leonard
Tracing Cross-Connections.....Jack Davis
Blue River Diversion Project.....Glen Saunders

**Southwest Section—Scheduled Papers—October 17–19, 1944**

Address of Welcome.....*Mayor* Tom Miller
Response.....Thos. L. Amiss
The Austin Water Department.....Albert R. Davis, Marvin Turner and B. G. Cole
Water Meters.....Robert A. Steele
Maps and Records.....Wm. W. Brush
Distribution System Analysis by Hardy Cross Method.....Melvin P. Hatcher, Russell G. Kincaid and E. Shaw Cole
Electrolysis and Cathodic Protection.....Starr Thayer
A Little Hydrant History (*Illustrated with slides*).....L. A. Jackson
Study of Southwestern Streams.....Trigg Twichell
The Potentials of Underground Water Supplies in the Southwest.....Robert Dott
Reclamation of Used Water.....O. V. Lindell
Pending Legislation Affecting Water Supplies.....A. F. Mitchell and Chas. S. Clark
Slaking of Lime, Stabilization of Water, Utilization of Sludge.....Frank S. Taylor
Zeolite Softening—Lime Treatment and Stabilization With Polyphosphate.....L. C. Billings
Boiler Feed Water Treatment.....M. C. Schwartz
Discussion.....O. M. Smith
Outlook on Water Works Materials.....Walter L. Picton and A. Webb Roberts
"They Saw Tomorrow".....*A Colored Motion Picture*
"Hello Neighbor".....*A Colored Motion Picture*
"Water—Friend or Enemy".....*A Colored Motion Picture*
"Beneath the Surface".....*A Motion Picture*
Bactericidal Efficiency of Free Chlorine Residual.....A. E. Griffin
Latest Development in the Sterilization Field.....Linn H. Enslow
Disposal of Salt Water From Oil Fields—*A Symposium*
Injection Method.....W. S. Morris
Impounding Reservoirs.....M. F. Granville
A Complete Solution for the Problem in Texas.....A. M. Brenneke
Experiences Gained in Furnishing Water to the Army.....Harold W. Keller
Drinking Water Standards.....J. K. Hoskins
Drilling of Wells.....E. A. Vaubel

Panel Discussion—Licensing and Training of Water Works Personnel:
Arkansas.....W. R. Spencer
Louisiana.....J. H. O'Neill
Oklahoma.....H. J. Darcey
Texas.....V. M. Ehlers
From the Army Standpoint.....R. M. Dixon
In-Service Training of Personnel.....Gwynne Conrad
Present and Future Personnel Problems.....Dwight Horton
Costkeeping and Budget Control.....Joe Huffman

**California Section—Scheduled Papers—October 24–26, 1944**

Some Interesting Observations of Water Treatment Practices.....Rolf Eliassen
Water Purification—Some Reminiscences.....Charles Gilman Hyde
Address of Welcome.....*Mayor* Fletcher Bowron
Symposium—U.S. Public Health Service Drinking Water Standards
Applying the Revised Drinking Water Standards.....J. K. Hoskins
The Part the State Department of Public Health Plays in the Certification of Water Supplies for Use on Common Carriers.....C. G. Gillespie
Practical Aspects of the U.S.P.H.S. Drinking Water Standards From the Water Works Standpoint.....R. F. Goudey
The Influence of War on Design of Water Facilities for San Diego.....Fred D. Pyle
The Prevention of Pipeline Corrosion.....W. R. Schneider
Headaches of Small Water Works Management.....W. A. Bush
The Rehabilitation, Cleaning and Sterilization of Water Wells.....Loren E. Blakeley
Discussion.....Charles Gilman Hyde
Design and Construction of Pre-stressed Concrete Tanks.....Robert C. Kennedy
Trends in Licensing Professional and Sub-Professional Water Works Employees and Unionization.....W. J. O'Connell Jr.
Operation and Maintenance of Water Treatment Plant Appurtenances...Carl M. Hoskinson
Disposal of Softening Plant Wastes.....James M. Montgomery
Operating Experiences at LaVerne Softening Plant—Experimental Work....Lee Streicher
Application of Ion Exchangers.....Paul F. Bovard
Water for Oil Field Purposes.....F. T. Willis
Late Developments in U.S. Army Water Supply Methods at Home and Overseas.....
Rufus W. Putnam
Postwar Planning for Water Supply Utilities.....Chester A. Smith
Cross-Connection Control and Elimination.....W. E. Shaw
Liability for Water-Borne Disease.....James H. Howard
Distribution System Flow Analysis Methods.....Charles J. Itter
Water Consumption and Unaccounted-for Losses.....H. A. Harris Jr.
Round Table Discussion of Current Problems.....*Conducted by* Walter O. Weight
Bacteriology of Water Pipes: An Introductory Note.....Carl Wilson
Trends in American Water Laboratory Practice.....D. W. Graham
Simplification of the Soap Method of Determining Calcium, Magnesium and Total Hardness in Water.....J. J. Connors
Value of the Water Works Chemical Laboratory.....
E. J. Lynde, Frank E. Marks and Ted V. Ackerman
Water Treatment at Eureka.....Roy Coupal

**West Virginia Section—Scheduled Papers—October 26–27, 1944**

Address of Welcome.....*Mayor* Golden Underwood
Response.....J. C. Edwards
Demonstration of Sea Water Desalting Kit.....H. Y. Keeler

Experiments on Odor Removal With High-Pressure Aeration.....
Lawson Haynes and Wallace Grant
Leak Detection.....Nickey Leshkow
Guided Discussion—Troubles and Experiences.....*Led by* Perkins Boynton
Looking Ahead in the Water Works Field.....Harry E. Jordan
Changing Trends in Materials and Equipment Which Affect Water Utilities..G. C. Sullivan
Water Treatment at the Institute, West Virginia, Synthetic Rubber Plant.....E. L. Borg
Meter Shop Practice.....Bernard Tasker and John Devine
Surface Water Resources of West Virginia.....
Recent Developments in Chlorine Control Tests.....N. S. Chamberlin and J. P. Kavanagh
Weak Links in the Water Purification Chain.....Frank Woodbury Jones
A Daily Dose of Danger or a Safe Water Supply?.....William E. Holy
Wartime Operation of an Ohio River Water Plant.....A. R. Todd and P. D. Simmons
Ground-Water Resources in West Virginia.....R. M. Jeffords
Installation and Maintenance of Centrifugal Pumps.....M. J. Carmack
New Well Construction at Parkersburg.....C. E. Records

**New Jersey Section—Fall Meeting—Scheduled Papers—November 2–4, 1944**

The State of A.W.W.A.....Samuel F. Newkirk Jr.
New Developments in Cathodic Protection.....P. S. Wilson
Drilling a Rock Well at Ridgewood, N.J. (*A colored motion picture*).....J. A. Carr
Distribution of Water in Relation to Customers' Viewpoint.....M. W. Cowles
Rehabilitation of Transmission Mains in Trenton, New Jersey.....J. A. Frank
Interruptions of Electrical Supply.....A. C. Hutson
Water Conservation Through a Metering Program.....M. M. Gibbons
The Present-Day Scope of Pitometer Surveys.....E. Shaw Cole

**Four States Section—Scheduled Papers—November 8–10, 1944**

Address of Welcome.....Martin J. McLaughlin
The Conservation of Water Resources and Its Progress in Maryland.....
Joseph T. Singewald Jr.
Ground-Water Investigations in Pennsylvania.....George H. Ashley and Jack B. Graham
Practicing Ground-Water Conservation.....G. J. Requardt
Natural Fluctuations of Ground Water and Interpretation in Terms of River Flow.....
Carroll F. Merriam
Ground-Water Problems in New Jersey.....H. G. Barksdale
Good Housekeeping Pays.....Leon S. Duckworth
Discussion.....*Led by* A. M. Tawney
Postwar Air-Conditioning Facts of Interest to Water Works Men.....Ted H. Kain
Sensible Disinfection of New Mains.....Cecil K. Calvert
Discussion.....*Led by* Carl J. Lauter
Round Table Discussion—Operating Problems
Job to Get Done.....*Led by* R. W. Ockershausen
Break-point Control in a One-Horse Plant by a One-Horse Guy.....*Led by* L. F. Newell
Water Coagulation and the Benefits From Good Floc Formation.....
*Led by* R. W. Ockershausen
Operating Records—Why Do We Keep Them and What Is Their Value.....
*Led by* Wm. C. Emigh
Results of Water Conservation Program
Philadelphia.....Martin J. McLaughlin
Washington.....E. A. Schmitt
Progress and Prospects.....Samuel F. Newkirk Jr.
Uprating Water Supply Facilities to Meet War Demands—*A Symposium*.....
*Conducted by* Francis S. Freil

Stepping Up Slow Sand Plants.....J. C. Smith
Bringing a Rapid Sand Plant up to Its Reasonable Maximum Output.....G. D. Houtman
Getting Designed Capacity From Distribution Systems by Cleaning and Lining.....
A. L. Frank and David Auld

**Virginia Section—Scheduled Papers—November 14–15, 1944**

Reading of Meters and Collection of Water Bills.....W. B. Harman
Testing and Repair of Meters.....A. T. Lundberg
Installation of Services and Selection of Meters.....Seth Burnley
Experiences With Mechanical Joint Pipe.....E. R. Sharp
Problems and Prospects: An Attempt at Crystal Gazing.....I. M. Glace
Looking Ahead in the Water Works Field.....Harry E. Jordan
Chlorination Experiences at Norfolk, Va.....R. W. Fitzgerald
Small Water Supplies Along the C. & O. R.R.....H. E. Silcox
Eliminating Tastes and Odors From River Water Supply.....C. L. Crockett

**Florida Section—Scheduled Papers—November 16–18, 1944**

Addresses of Welcome.....*Mayor* George S. Patterson and W. F. Davenport
Response.....F. A. Eidsness
Federal Works Agency Construction in Florida.....J. R. Brennan
The St. Petersburg Water Treatment Plant.....C. E. Gasser
Water Softening in the United States—Past and Present.....H. M. Olson
Problems in Supplying a Wartime Water Demand at Norfolk, Virginia....R. W. Fitzgerald
A New Development in the Flocculation of Water—The Walking Beam Flocculator.....
F. E. Stuart
An Interpretation of Water Analyses for the Practical Man.....D. R. Taylor
Discussion.....L. H. Scott
American Water Works Association Activities.....Samuel F. Newkirk Jr.
Calgon Treatment.....J. T. Potter
Panel Discussion—Sterilization of Water Mains.....
F. A. Eidsness, L. D. St. John, W. T. Calaway, George F. Higgins and A. E. Griffin
The Treatment of Boiler Waters.....W. O. Widener
Symposium—Water Conservation:
Public Health Aspects of Water Resources and Water Conservation.....J. B. Miller
Salt Water Encroachment in Southern Florida.....Gerald G. Parker
Ground-Water Problems in Florida.....H. H. Cooper Jr.
Notes on Sources of Municipal Water Supply in Central and Southern Florida.....
G. E. Ferguson
Well Drilling—A Major Engineering Problem.....*A Colored Motion Picture*

The following Sections held meetings in affiliation with other associations and groups: Four States Section and Pennsylvania Water Works Operators Association; Indiana Section and the Indiana State Board of Health; Michigan Section and the Michigan Conference on Water Purification; Rocky Mountain Section and Rocky Mountain Sewage Works Association; and West Virginia Section and the West Virginia Conference on Water Purification.

## Section Meetings—1940–1944

| *Section* | *1940* | *1941* | *1942* | *1943* | *1944* | *Meeting Place—1944* |
|---|---|---|---|---|---|---|
| California | Oct. 23–26 | Oct. 22–24 | Oct. 28–30 | Oct. 27–30 | Oct. 24–26 | Los Angeles, Calif. |
| Canadian | Mar. 27–29 | June 23 | Apr. 15–17 | Apr. 7–9 | Apr. 19–21 | Niagara Falls, Ont. |
| Cuban | May 21 | —— | Feb. 17 | Oct. 4 | —— | No scheduled meeting |
| Florida | May 16–18 | Nov. 13–15 | Nov. 12–14 | Nov. 18–20 | Nov. 16–18 | St. Petersburg, Fla. |
| Four States | Nov. 7–8 | Nov. 5–7 | Oct. 7–9 | Oct. 14–16 | Nov. 8–10 | Philadelphia, Pa. |
| Illinois | May 22–24 | Apr. 28–30 | June 22 | Apr. 8–9 | Apr. 11–13 | Peoria, Ill. |
| Indiana | Apr. 4–5 | Apr. 24–25 | Apr. 9–10 | Apr. 29–30 | Apr. 13–14 | Indianapolis, Ind. |
| Kentucky-Tennessee | Oct. 21–23 | Oct. 27–29 | Oct. 19–21 | —— | —— | No scheduled meeting |
| Michigan | Sept. 11–13 | Sept. 24–26 | —— | Apr. 20–22 | Apr. 26–28 | Jackson, Mich. |
| Minnesota | Nov. 7–9 | Oct. 9–11 | Sept. 24–26 | Mar. 12–13 | Mar. 16–17 | St. Paul, Minn. |
| Missouri Valley | Nov. 13–15 | Oct. 20–22 | Oct. 22–24 | Oct. 15–16 | —— | No scheduled meeting |
| Montana | Apr. 5–6 | May 23–24 | Apr. 17–18 | May 14–15 | May 5–6 | Bozeman, Mont. |
| New England | —— | —— | —— | —— | —— | No scheduled meeting |
| New Jersey | Feb. 7 | Feb. 19 | Mar. 26 | Mar. 14 | Feb. 10 | Newark, N. J. |
| | May 22 | May 22 | Oct. 7–9 | Apr. 9 | May 11 | Trenton, N. J. |
| | Oct. 18–19 | Oct. 16–18 | —— | Nov. 4–6 | Nov. 2–4 | Atlantic City, N. J. |
| New York | June 6–7 | Mar. 27–28 | Apr. 30–May 1 | Mar. 25–26 | Apr. 27–28 | Utica, N. Y. |
| | Sept. 25 | Sept. 11–12 | Oct. 15–16 | Sept. 30–Oct. 1 | —— | |
| | Dec. 27 | Dec. 30 | Dec. 30 | —— | —— | |
| North Carolina | Oct. 28–30 | Nov. 3–5 | Nov. 3–4 | Nov. 2–3 | —— | No scheduled meeting |
| Ohio | May 9–10 | May 15–16 | May 14–15 | Apr. 12 | May 18–19 | Columbus, Ohio |
| Pacific Northwest | May 8–10 | May 8–10 | May 8–9 | May 7–8 | May 12–13 | Olympia, Wash. |
| Rocky Mountain | Sept. 16–18 | Sept. 17–19 | Sept. 17–18 | Sept. 15–17 | Sept. 20–22 | Denver, Colo. |
| Southeastern | Mar. 18–20 | May 12–14 | Apr. 20 | —— | May 8–10 | Greenville, S.C. |
| Southwest | Oct. 14–17 | Oct. 13–16 | Oct. 12–14 | Oct. 11–13 | Oct. 17–19 | Austin, Tex. |
| Virginia | Sept. 5–6 | Oct. 30–31 | Nov. 5–6 | Nov. 22–23 | Nov. 14–15 | Richmond, Va. |
| West Virginia | Oct. 24–26 | Oct. 30–Nov. 1 | Nov. 12–13 | Nov. 4–5 | Oct. 26–27 | Parkersburg, W.Va. |
| Western Pennsylvania | Sept. 18–20 | Aug. 7–9 | Sept. 18 | Sept. 23 | —— | No scheduled meeting |
| Wisconsin | Oct. 14–16 | Oct. 6–8 | Oct. 20–21 | Oct. 19–21 | —— | No scheduled meeting |

## Section Membership at Time of, and Total Attendance at, Section Meetings—1940–44

| SECTION | 1940 | | 1941 | | 1942 | | 1943 | | 1944 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Membership | Attendance | Membership | Attendance | Membership | Attendance | Membership | Attendance | Membership | Attendance |
| California | 501 | 1,082 | 552 | 688 | 566 | 571 | 589 | 915 | 638 | 926 |
| Canadian | 219 | 367 | 262 | * | 266 | 410 | 289 | 447 | 323 | 555 |
| Cuban | 27 | † | 35 | † | 41 | 17 | 36 | ‡ | 34 | ‡ |
| Florida | 76 | 134 | 78 | 110 | 94 | 108 | 111 | 105 | 138 | 157 |
| Four States | 186 | 177 | 210 | 177 | 229 | 345 \|\| | 278 | 359 | 324 | 325 |
| Illinois | 199 | 226 | 197 | 152 | 284 | * | 282 | 142 | 293 | 126 |
| Indiana | 125 | 200 | 142 | 223 | 142 | 190 | 175 | 200 | 202 | 221 |
| Kentucky-Tenn | 89 | 93 | 105 | 91 | 111 | 73 | 117 | † | 127 | † |
| Michigan | 116 | 233 | 124 | 245 | 122 | † | 126 | 215 | 135 | 205 |
| Minnesota | 77 | 169 | 86 | 144 | 90 | 180 | 90 | 178 | 102 | 202 |
| Missouri Valley | 197 | 150 | 199 | 153 | 199 | 96 | 201 | 124 | 228 | † |
| Montana | 41 | 75 | 42 | 66 | 42 | 71 | 46 | 71 | 53 | 82 |
| New England | 137 | † | 139 | † | 144 | † | 146 | † | 154 | † |
| New Jersey¶ | 218 | 172 | 221 | 134 | 211 | 184 | 261 | 135 | 266 | 119 |
| New York§ | 440 | 206 | 472 | 171 | 486 | 200 | 509 | 194 | 510 | ‡ |
| North Carolina | 108 | 226 | 113 | 243 | 138 | 192 | 160 | 202 | 155 | † |
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* Regular meeting canceled. Business meeting held at annual convention.

† No regular meeting scheduled. Membership given as of date of annual convention.

‡ No record of attendance.

§ Only Fall meeting recorded here.

|| Joint meeting with New Jersey Section.

¶ Spring meeting recorded here. Fall meeting held jointly with Four States Section.

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# NEWS OF THE FIELD

**Here is welcome confirmation** of the information that has been coming to the water works field in recent months. By inference, it is an endorsement of the action taken by the governing bodies of the New England Water Works Assn., the Federation of Sewage Works Assn., the Water and Sewage Works Manufacturers Assn., and the A.W.W.A., when they organized the Committee on Water and Sewage Works Development and began the promotion of their idea to *Blueprint Now*. William L. Batt, Vice-Ch. of WPB, and U.S. Member and Representative on the Combined Raw Materials Bd. and Combined Production and Resources Bd., made the following statement when he addressed the Chicago Assn. of Commerce on January 5:

> Now that the Army is reasonably well equipped and is beginning to see more or less adequate reserves of material at the places where it needs them, some of its programs can be reduced, and since the period of acceleration of the war production program is pretty well over and we are able to run along on a more level rate, many of our raw materials are in sufficient supply that the atmosphere of urgency can be taken off their procurement. Remembering the days when one heard nothing but constant complaints of the shortage of aluminum, it is gratifying to see that the supply of aluminum actually exceeds the current rate of war consumption. This is similarly true of copper and some of the other less publicized non-ferrous metals. We still cannot get steel in the form of plate and sheets at as large a rate as the military forces would like, but other forms of steel are available in larger quantities than military needs can absorb. While manpower is very critical in many areas of the country, there are spots here and there where the pressure has eased off substantially, and more and more one finds plants not fully occupied with war work. That promises to be an acutely serious problem when Germany goes down.

Can anyone ask for a more authoritative statement to justify planning now for work to be done when materials and manpower become more widely available?

Batt continued his speech with some thoughts related to economic planning for the years after the war which are much more important than has hitherto been believed:

> Traditionally, we have thought of ourselves as a people of great natural resources. We have thought of ourselves as possessing unlimited quantities of everything which our economy needed—iron and steel, zinc, copper and tin, and

(*Continued on page 2*)

(*Continued from page 1*)

so on, and generally speaking, that has been true. The American economy has been built on these large natural resources of more or less low-cost materials. It has not occurred to most of us that there could be an end to these resources, and the shocking point which I want to try to bring to you is that many of these resources are approaching an end. Indeed, some of them are now at that point. I shan't try to be too precise as to how much of these materials we have because that will always be an arguable question if the limits are too closely set. I don't want you to feel that I am dealing inadequately with the question if for that reason I am somewhat approximate.

Our high grade iron ore deposits in the Mesaba range have not many years left; at the present rate of usage I am informed that we shall be reduced to low-grade deposits within another ten years. Our high grade zinc is practically gone. Our good copper deposits will be a thing of history in another 25 years. There is much argument about petroleum because of the unknown nature of possible reserves, but many authorities will tell you that our petroleum reserves are being severely strained and may well approach the scarcity range within this lifetime. We never had much high-grade bauxite—the familiar base for aluminum —and we have used up a good part of those limited reserves in this emergency. The United States has no nickel, and for practical purposes, no tin. Our wood resources have been wastefully used, and many of our large stands of timber are gone with little or no reforestation plans to provide replacements for another generation. I could give you many more examples, but this will be enough to emphasize the point I want to make, and that is that the United States is passing from a country of plenty to a country of scarcity in the field of metals and minerals and other critical supplies. It will be said, of course, that we have reserves of low-grade materials which we could fall back on, and to some extent we could, but at much higher cost and with great difficulties. Confronted by an emergency which taxed our resources of manpower and transportation we would not find ourselves in that happy position with which we have met this emergency, and there are several of these materials in which we would be defenseless. It may not be stressing the point too far to suggest that we are moving in the direction in which England has found herself, that of having to depend on imports of material from abroad in order to maintain her very lifeblood of existence.

It is this line of reasoning which has made me so keenly interested in the proposal advanced by a few of our soundest thinkers in this field; that is, that we make every effort to import all of the critical materials which we can from abroad and use as little of our own precious remaining supplies. Accepting this national policy, we should say to foreign countries, still rich in natural resources, "We will ship you all of the manufactured articles which we have in surplus and which you want, provided you pay us in the raw materials of which you have an exportable supply. But we want those materials to be materials which we can use in our own economy." That would, of course, sharply reduce our emphasis on gold as a means of payment. We would then bring in as much gold as we needed to maintain our financial programs and only as much more as is needed to meet our limited industrial demands, and I can assure you that those demands are very limited. Incidentally, this would be a distinct help toward occupying those surplus ships which we shall have built during this war and for which adequate cargoes will be hard to find when the war is over.

(*Continued on page 4*)

*Looking ahead with Asbestos*

**Labor was short . . . time was shorter . . . the answer was K&M "Century" Pipe**

The "go ahead" had been given. Construction of 113 homes for the personnel of a nearby Naval Air Training Station was a rush job.

This meant that water supply lines had to be installed by the borough without delay. Despite the fact that the only available labor was a crew of three middle aged men, installation went smoothly and rapidly—thanks to the foresight of the mayor of this community. He wisely selected—K&M "Century" Asbestos-Cement Pipe—in the time and labor saving 18 ft. lengths.

This rugged, long-lasting pipe is so light in weight that the three man crew handled the longer lengths with ease—laying as much as 600 feet of "Century" pipe a day, in the face of rain and bad weather much of the time. Approximately 8,000 feet were installed in all.

Another advantage that speeds up assembly and permits curves without bends or special fittings, is "Century" Pipe's flexible, leak-proof joints. For the maintenance-minded, remember that this pipe cannot corrode or tuberculate.

At K&M we are making more "Century" Asbestos-Cement Pipe than ever before. As a result, we can supply your requirements promptly.

Looking ahead to the promise and the problems of the post-war world, research never slackens at K&M, seeking means to improve present products and find further and better applications of nature's strangest mineral.

* * *

*Nature made asbestos;*
*Keasbey & Mattison,*
*America's asbestos pioneer,*
*has made it serve mankind . . . since 1873*

**KEASBEY & MATTISON**
**COMPANY, AMBLER, PENNSYLVANIA**

★ Our Ambler plants proudly fly the Army-Navy "E" flag — an honor awarded K&M employees "for obtstanding production of war materials."

(*Continued from page 2*)

**Reeves Newsom,** formerly A.W.W.A. President and for several years a consulting engineer in the field of water works design and management, will become Manager of the Village of Scarsdale, N.Y., on March 1. This Westchester County community, made up of New York and metropolitan area business men, has a long record of fine public administration under a village form of government with a board of trustees and mayor. Arthur Boniface, a member of A.W.W.A., had been Village Manager for more than a score of years when he died some months ago. Franklin Henshaw, the donor of the A.W.W.A. prize, the Henshaw Cup, was for a number of years Superintendent of the Water Dept. there.

Prior to his consulting engineering activities, Mr. Newsom was President of the Community Water Service Co., and, at an earlier date, Commissioner of Water Supply at Lynn, Mass.

The consulting engineering activities of the firm of Newsom and Aldrich will be carried on by E. H. Aldrich at the present address—500 Fifth Avenue, New York 18, N.Y.

**J. K. Hoskins,** former Sr. San. Engr., U.S. Public Health Service, has been made Assistant Surgeon General, in charge of the Division of Sanitary Engineering, a new branch which resulted from the recent reorganization of the Service. The new post corresponds to the rank of Brigadier General.

Hoskins has been with the U.S.P.H.S. for 29 years, and has been chiefly engaged in stream pollution studies. His work for many years was devoted to the pollution and recovery program on the Ohio River, and JOURNAL readers will recall his many articles detailing the results of his experiences. During World War I he supervised extra-cantonment zone sanitation activities at several army posts.

Hoskins graduated in engineering from Penn. State College and did postgraduate work at the University of Berlin. Before going to the U.S.P.H.S. in 1914, he was engaged with several consulting engineers on water and sewage works construction.

(*Continued on page 6*)

**Harry M. Laudemann,** Chief Chem., Water Supply Dept., Chesapeake & Ohio Railway Co., died on December 16th after a prolonged illness.

Laudemann was born in Nappanee, Ind., and attended the University of Illinois, class of 1912. Before going to the Chesapeake and Ohio Railway in 1934, he had been Chemist for the Hercules Powder Co. and the Anaconda Copper Co., and Assistant Chief Chemist for the Aluminum Co. of America. He was active in the West Virginia Section.

# HILL-HUBBELL Steel Pipe Protection

## ..is "on the beam"..

We're lining up for the postwar formation to serve the water industry.

Streamlined production will put us squarely "ON THE BEAM" to supply you with *factory process* HILL-HUBBELL STEEL PIPE PROTECTION.

Coating and Wrapping and Lining *to meet* Specification A. W. W. A. 7A.6

**GENERAL PAINT CORPORATION**
HILL, HUBBELL & CO. • Division • Cleveland, Ohio
• EXPORT OFFICE: SAN FRANCISCO, CALIFORNIA, U. S. A. •

(*Continued from page 4*)

**Maj. F. G. Wightman,** who has served with the Royal Canadian Engineers on the Atlantic Coast for nearly three years, was transferred to command of an Engineer Unit in the Montreal area last April. After six months in that location, he was appointed Chief Engineer Officer on the Command Staff at Camp Borden, Ont.

**Paul A. Chorney,** former Supt. of the Ogdenburg, N.J., Boro Water Dept., is now a Staff Sergeant in the Army Air Force, and posted at Charleston, S.C.

**Harvey J. Kulin,** former Sales Engr., American Well Works, Indianapolis, has been promoted to the rank of Captain and assigned to Fort Smith, Ark.

**Elmer W. Campbell,** of the Maine State Health Dept., is a Captain in the Sanitary Branch, A.U.S., and is engaged at the Station Hospital, Fort Dix, N.J.

**Frank G. Crow,** on leave of absence from the position of Supt. and Genl. Mgr. of the Water Dept. of Florence, Ala., is serving as a Major in the 151st Engineers in Alaska. The employees in his department are carrying on with the assistance of the Finance and Water Comr. of the city, and Maj. Crow is not being replaced for the duration.

**J. R. Rossum,** former Jr. Engr. of Water Sanitation, Water Dept., San. Diego, Calif., is now Sanitary Engineer with the California Water Service Co. in San Jose.

**William K. Dickson,** former Civ. Engr., Charlotte, N. C., has been advanced in rank from Lieutenant Colonel to Colonel, and is in the Supply and Service Div. at Fort Bragg, N.C.

**L. S. Vance,** former Chief Engr. and Supt. of the Louisville, Ky., Water Co., has been promoted to the rank of Colonel. He is at Maxwell Field, Montgomery, Ala., where he has been for the past year and a half.

**Dudley Peters Glick,** former Assoc. Bacteriologist, Col. Experimental Station, became Director of Laboratories, City of Akron, Ohio, Health Department, on January first. At the time of his transfer, he was a trustee of the Rocky Mountain Section, A.W.W.A., and he has served on the faculty of the Water Works School there.

(*Continued on page 8*)

# ALL

## OUR U. S. PLANTS FLY THIS FLAG

Among the first in the brass industry to receive the "E" Award for outstanding production were the Connecticut plants of The American Brass Company. Since then *all* our plants, including those in Michigan, Wisconsin and New York, have been similarly honored.

Since 1939, production of copper, brass and other copper alloys has been tripled, with every pound today going for war purposes. This was accomplished by close cooperation between management and labor . . . careful planning for rapid conversion to wartime operations . . . intensive training of new personnel . . . and efficient utilization of existing and new plant equipment.

4363

ANACONDA

*Anaconda Copper & Brass*

THE AMERICAN BRASS COMPANY: General Offices: Waterbury 88, Connecticut
*Subsidiary of Anaconda Copper Mining Company*
*In Canada:* ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

(*Continued from page 6*)

**John J. Dwyer,** former Asst. Chem., Water Supply Dept., Chesapeake & Ohio Railway, is now Chief Chemist, succeeding the late Harry M. Laudemann.

**Carter H. Lamb,** former Valuation Engr. of the Jamaica, N.Y., Water Supply Co., has been made Vice-President of that company.

**T. A. Filipi,** former Public Health Engr. of the Neb. State Dept. of Health, is now Director of their Division of Sanitation.

**John Fred Wilkes,** former Chem. Engr., Dearborn Chemical Co., Atlanta, Ga., and now a Captain in the Signal Corps, is stationed at the Army Electronics Training Center in Boston.

**C. H. Connell,** former Assoc. Prof. of San. Eng., Tex. A. & M. College, has been promoted to the rank of Major and is stationed in the 18th Medical General Laboratory, Ft. Sam Houston, Tex. Maj. Connell was transferred there from the Medical Field Service School, Carlisle Barracks, Pa., where he was an instructor in the Dept. of Military Sanitation.

**Capt. Sidney Wells,** former Chem., Fla. State Bd. of Health, is now attached to a general hospital in England. He was transferred there from Greenwood, Miss.

**Frederico A. L. Velloso,** who has been Chief Engr. at the Serviços de Aguas E Esgotos, at College Station, Texas, will return in March to his home in Bahia, Brazil.

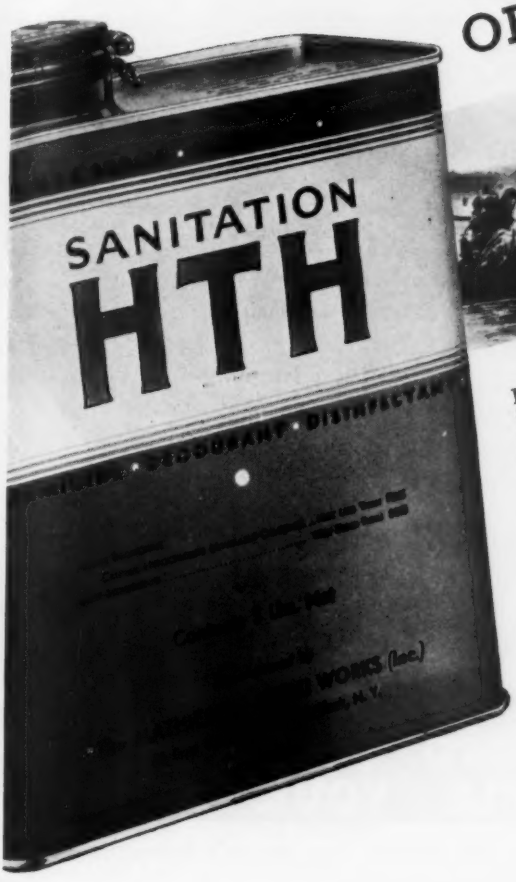
**James L. Glenn,** who was with the Fraser Brace Eng. Co. before becoming a Captain in the Corps of Engineers in June, is now posted at Ft. Leonard Wood, Mo. As an independent consultant, Capt. Glenn was active for many years in construction engineering and design of water treatment, collection and distribution systems in many parts of the U.S., South American, Panama, Cuba, and a number of the U.S.'s Pacific islands.

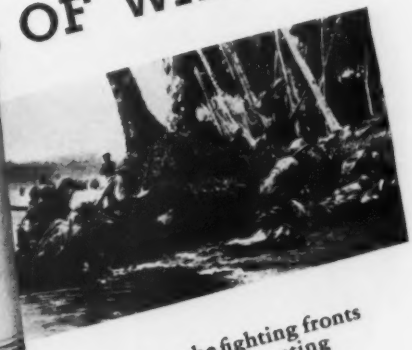
**William H. Cary Jr.** has been transferred from his post as a Dist. Engr. in the U.S. Public Health Service, Chicago, to the District of Columbia Health Dept., where he is acting as Director of the Bureau of Sanitation.

**Fred H. Dierker,** former member of the San. Eng. Dept., East Bay Municipal Utility Dist. of Oakland, Calif., is now overseas with the Seabees, in which he holds the commission of Ensign.

(*Continued on page 10*)

# MEETING THE TEST OF WAR



Right up at the fighting fronts in portable water-treating units, Mathieson Sanitation H T H is meeting the test of war . . . helping to keep water supplies safe for our armed forces. This dependable, mobile chlorine carrier is also standing guard against the menace of water-borne disease at training stations, camps and outposts all over the world.

*. . . Serving the Home Front, Too*

But there's still enough Sanitation H T H available to take care of essential needs at home such as water treatment and swimming pool sanitation. Write for further information and nearest source of supply.

## Mathieson Sanitation HTH

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42nd ST., NEW YORK 17, N. Y.

Sanitation H T H . . . Liquid Chlorine . . . Ph-Plus . . . Fused Alkali . . . Caustic Soda . . . Soda Ash
Bicarbonate of Soda . . . Bleaching Powder . . . Ammonia, Anhydrous & Aqua . . . Dry Ice
Carbonic Gas . . . Synthetic Salt Cake . . . Sodium Chlorite Products . . . Sodium Methylate

(*Continued from page 8*)

**Lt. Col. Maurice R. Scharff,** Cons. Engr., New York City, is now Chief of the Products Branch, Production Div., Army Service Forces, in Washington.

**Jessup De Hart,** Public Service Co. of Ind., has been transferred from the Noblesville plant to the Power Dept. of the Edwardsport Plant, and is now living in Bicknell.

**Lawrence H. Lingnor,** formerly attached to the Chicago office of *Water Works and Sewerage,* is now Storekeeper, 3/c, at the U.S. Naval Training Station, Great Lakes, Ill.

**Robert R. Ashline,** Electrolysis Engr. in the Dept. of Water and Power, Los Angeles, is on leave of absence and serving in the Navy as Electrician's Mate, 1/C. He is at present stationed at Camp Peary, Va.

**Capt. D. S. Abell,** Sn. C., former Chief Engr. and Director, Bur. of San., Health Dept., Montgomery, Ala., is now in England.

(*Continued on page 12*)

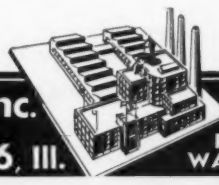
**SCALE AND CORROSION CAN CRIPPLE YOUR PLANT**

Your plant is being attacked today, tonight, every day by a destructive force. Scale and corrosion are enemies to your piping system, boilers and condensers. So secretive is their work that before you realize it your plant efficiency is reduced and your production slowed up.

Call in a Haering engineer today without obligation. He will show you how Haering Glucosates save you money and increase production. He will prove to you that Haering Glucosates correct these conditions definitely and protect your equipment against scale and corrosion.

***Write for these booklets . . .***

**"Organic Methods of Scale and Corrosion Control"**
**"H-O-H Lighthouse"**



**D. W. HAERING & CO., Inc.**
GENERAL OFFICES
**205 West Wacker Drive, Chicago 6, Ill.**

WE READ WATER

PHOTO
MACFADDEN
PUBLICATIONS

# STEEL SCRAP is worth its weight in lives!

Your country needs 15 million tons of steel scrap this winter.

Every ton could well save an American life in the big push. The fighting Yanks must have grenades, flame-throwers, landing barges, tanks, and guns in quantities outstripping all previous requirements. They'll need plenty of weapons to enlarge the bridgeheads on Europe.

Steel is the backbone of war weapons, and there won't be enough unless we turn in the scrap.

Heavy scrap is especially desirable. Search your plants and storage buildings with renewed vigor. Take another look at obsolete tools and old pipe, at everything made of iron or steel. Make this a rule: If it won't serve some useful purpose, scrap it!

Waterworks officials will want to do another great job this year. Comb your properties from top to bottom, separate the various kinds of scrap as best you can, and then call the scrap dealer. (The Steel Industry will pay government-established prices for all scrap.) The American Rolling Mill Company, 431 Curtis Street, Middletown, Ohio.

EXPORT, THE ARMCO INTERNATIONAL CORPORATION

★ ★ ARMCO ★ ★

**TURN IN ALL YOUR SCRAP**

*This advertisement is in support of the Salvage Program of the Conservation Division of the War Production Board.*

(*Continued from page 10*)

**Wellington Donaldson** has been made Chief of the Bureau of Sewage Disposal Design in New York City. He was Director of the Bureau.

**Gerald W. Ferguson,** Asst. San. Engr. with the U.S. Public Health Service, has been transferred from Jacksonville, Fla., to Charleston, S.C.

**Gilbert M. Smith,** former Sales Engr., Johns-Manville Sales Corp., Rochester, Ind., is now a Sanitary Engineer at Camp Breckinridge, Ky.

**Richard F. Hill,** former Asst. Engr. with the N.C. State Bd. of Health, is now a Captain in the Corps of Engineers and is Director of the Engineer Division at Camp Sutton, N.C.

**James R. Cook,** who has been engaged in the New York office of Parson, Brickerhoff, Hogan & MacDonald on the work of the firm in Venezuela for the past 18 months, has gone to Caracas to work for the next year and a half. He is working principally on the Caracas water supply system, which consists of two earth dams, a hydroelectric plant and transmission line, and on a water distribution and sewerage system for the city.

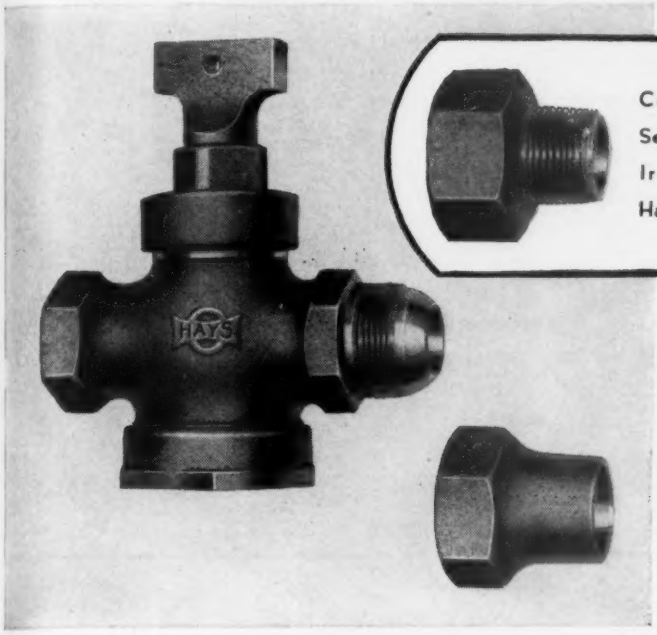
**Edwin Day Burchard,** Dist. Engr. in the U.S. Geological Survey, formerly at Asheville, N.C., is now posted in Raleigh, N.C. He is in the Water Resources Branch of the Geological Survey, which has maintained a stream gaging program in co-operation with the N.C. Dept. of Conservation and Development since 1920. Eastward growth of the work made it desirable to operate two offices, and in October the district headquarters were moved from Asheville to Raleigh. The Asheville office continues to function for all work in the Tennessee Basin within North Carolina and the Hinassee Basin within North Carolina and Georgia.

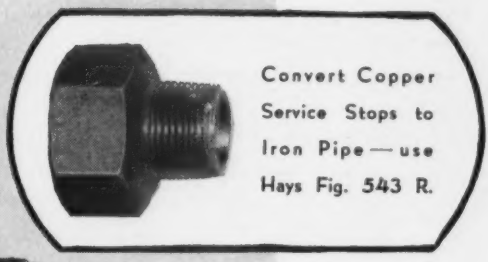
**Maj. Robert W. Austin** of Albany, N.Y., is now posted at the Chemical Warfare Service Unit Training Center, Camp Sibert, Ala. He was transferred there from the Chemical Warfare Service in Washington, D.C.

**W. McLean Bingley** is now a Captain in the Sanitary Corps, Medical Branch, and is posted in the Headquarters of the 8th Service Command, Dallas, Tex. Capt. Bingley was formerly engaged in work on water and sewage treatment projects for the Dorr Co. at Atlanta, Ga., and Richmond, Va.

(*Continued on page 14*)

# USE COPPER PIPE STOPS IN STOCK




Make use of copper service stops in stock when copper pipe is not available. If you wish to convert to iron pipe use Hays No. 543 R. Adapters.

HAYS MANUFACTURING CO • ERIE • PA.

WATER WORKS PRODUCTS

HAYS

(SINCE 1869)

★ Invest in Bonds today to provide for extensions tomorrow ★ ★ ★

(*Continued from page 12*)

**Lt. Harry B. Bowman,** formerly of Moorestown, N.J., has been transferred from Camp Claiborne, La., to an engineer's regiment at Camp Butner, N.C.

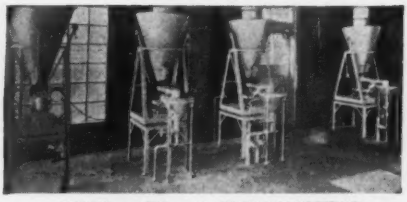
**First Lt. William H. Cranford,** formerly of Rock Hill, S.C., is now posted at the Reno Quartermaster Depot, Ft. Reno, Okla. Lt. Cranford was in Coast Artillery for a year, until his transfer in October to the Sanitary Corps. Upon completion of the Medical Inspector's Course at Carlisle Barracks, Pa., he went to Headquarters, 8th Sn. C., Dallas, Tex., and from there to Ft. Reno, where he is Sanitary Engineer. He visits ten other camps in the vicinity each month.

**Col. Thomas C. Green,** 39th Engr. Combat Regt., former Filtration Plant Supt., Austin, Tex., has been awarded the Legion of Merit for "exceptionally meritorious conduct" in the performance of outstanding services during the Sicilian campaign, July 14–Aug. 18, 1943. Col. Green was an officer of the Texas National Guard and entered army service when

(*Continued on page 16*)

SYNTRON

ELECTRONIC CONTROLLED VIBRATORY FEEDING OF DRY CHEMICALS



*"Vibra-Flow" VOLUMETRIC*

FEEDER MACHINES

Control the volume flow of dry chemicals and other bulk materials.
Rheostat control of rate of feed.
Vibrated, non-arching hopper.
Can also be automatically controlled by pH indicators, venturi meters, etc.

*"Weigh-Flow" GRAVIMETRIC*

FEEDER MACHINES

Provide a positive accurate and automatic "Weigh-Flow" of chemical.
Eliminate all guess work—and feed exactly the right amount—by weight.
Predetermined setting of scale automatically maintains desired weighed flow of material per unit of time.

*Sizes and styles available for your chemical feeding problem*
*Investigate their many advantages*

SYNTRON COMPANY, 428 Lexington Ave., Homer City, Pa.

LUDLOW HYDRANT CONSTRUCTION: Self-releasing 30° angle wedges and free-floating gates, self-adjusting to seats, afford smooth, trouble-free performance, long service. Opening and closing of hydrant automatically opens and closes drain, located at lowest point. Clogging is prevented. Gate is wedge-locked when closed, to prevent flooding. All working parts may be lifted through top of hydrant for easy inspection. Top and bottom bodies bolted together at ground line.

## No Gold Braid, *but*...



. . . the earnest men who direct and maintain vital municipal waterworks and sewerage systems have their strategical problems, too. They must conduct their campaigns against fire, flood and epidemics—all enemies of industry and public welfare which would interrupt or slow down manpower and production. They must marshal carefully such supplies as are available. They must shift equipment, make repairs and use to the utmost advantage whatever is obtainable under priority restrictions.

Ludlow, regardless of a sincere wish to be co-operative, is limited by rulings of the War Production Board. We will gladly send you such information as we have on WPB priorities and, when you have obtained a rating, we will make shipment with all possible promptness.

V-8

**THE LUDLOW VALVE MFG. CO., INC.**
TROY, N. Y.

# LUDLOW
## HYDRANTS AND VALVES
SINCE 1866

(*Continued from page 14*)

that unit was federalized in November 1940. He is a graduate of the U. of Texas, and has been an A.W.W.A. member since 1925.

His citation reads:

In the early stages of the campaign, the regiment commanded by Col. Green was required to support two divisions of the (name of the corps withheld) corps.

Although the regiment was widely separated and was operating over a large area, close contact with all units was maintained as a direct result of his extensive personal reconnaissances, frequently conducted over areas not cleared of mines and often under enemy artillery and small arms fire.

By marked foresight, Col. Green kept his battalions employed so effectively that he was able to repair quickly the damages caused by enemy demolition and to assume assignments normally performed by the division engineers, thereby making possible the advance of corps and division artillery to position in close support of the infantry.

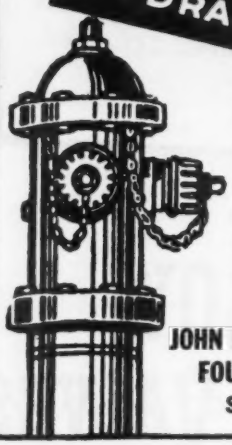
By his devotion to duty, courage and foresight, he gave invaluable support to the continuous and successful advance of the corps.

**Fourteen sanitary engineers** in the N.Y. State Dept. of Health held reserve commissions at the outbreak of World War II and were called

(*Continued on page 18*)

IN CASE OF FIRE

KUPFERLE FIRE HYDRANTS



Complying with A.W.W.A. specifications and proven by more than a half century of service.

JOHN C. KUPFERLE FOUNDRY CO.
ST. LOUIS

NO MORE RUST

Will Form Inside Your Steel Tanks If You Use

"RUSTOP"

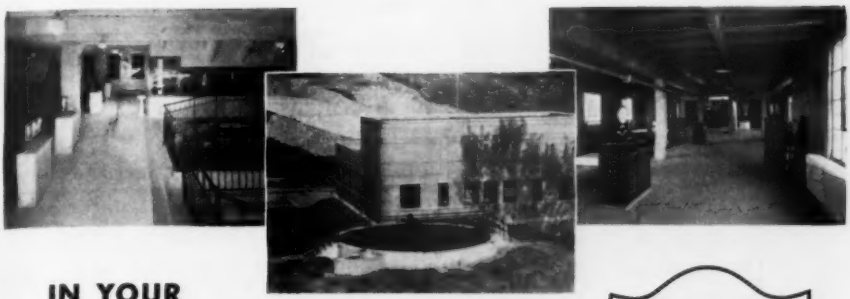
**STOPS CORROSION**—Immediately, Permanently, and **ECONOMICALLY**. No Sandblasting, Scraping or Painting. Many Types of Special Applications.

*Write immediately for complete data and quotations—No obligation.*

THE APPROVED METHOD

RUSTOP THE CATHODIC SYSTEM OF CORROSION PREVENTION

ELECTRO RUST-PROOFING CORP.
DAYTON • OHIO



**IN YOUR**
**POST WAR PLANNING**

*Remember—*

**The INFILCO Equipped**
**Water Purification Plant**
**CENTRALIZES EQUIPMENT RESPONSIBILITY**
**AND ASSURES COORDINATED RESULTS**

You are invited to make use of the experience gained by Infilco during the 40-odd years of designing and manufacturing every type and size of water purification equipment.

In furnishing everything required for water conditioning—from Accelators to Zeolites—Infilco offers you the important advantage of undivided responsibility for successful equipment operation.

And—your plant will be in step with modern developments, because Infilco has always been the first to introduce and adopt worthwhile improvements, as well as first to discard anything proving to be a hindrance to progress.

The services of its staff of experienced engineers and laboratory facilities are at your disposal for the asking.

INFILCO
INCORPORATED
325 W. 25TH PLACE • CHICAGO, ILL.

INFILCO

**PRODUCTS**

Accelators
Aerators
Automatic Controls
Chemical Feeders
Clarifiers
Coagulators
Digesters
Dosing Siphons
Filter Equipment
Flow Controllers
Flow Gauges
Fluorex Purifiers
Gravity Filters
Hydraulic Controls
Hydraulic Switches
Hydrodarco Purifiers
Level Controls
Lime Slakers
Loss of Head Gauges
Mixing Equipment
Pressure Filters
Proportioners
Recarbonators
Rotary Distributors
Samplers
Settlers
Sewage Activators
Sewage Equipment
Sewage Griductors
Venturi Tubes
Wagner Underdrains
Water Filters
Water Softeners
Zeolites

(*Continued from page 16*)

immediately. Of the junior engineers promoted to fill their positions, 8 are under 38 years of age and are now being processed for the Army. They will be commissioned early this year. This has caused a situation which is being met by a new plan devised by C. A. Holmquist, Dir. of the Div. of San. of the Dept. It calls for the intensive training of civil engineers while they are serving in the Department.

"The system," according to Holmquist, "is definitely a wartime measure, made necessary by the shortage of sanitary engineers in the country to fill the expected vacancies.

"The graduate engineers so far appointed will be trained in the field to fill the vacancies and to handle the public health engineering work in the districts to which they have been assigned. They will be under the supervision of sanitary engineers in adjacent districts. It was difficult to find men to fill these jobs and we canvassed practically the entire country."

**William B. Webb,** former Field Engr., General Filter Co., Denison, Tex., is now a Captain in the Sanitary Corps and is posted in the Station Hospital, Camp Hood, Tex.

(*Continued on page 20*)

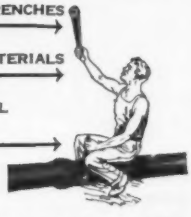
3 *Money, Time and Labor Saving Features of*

**UNIVERSAL CAST IRON PIPE**

LAID WITH ONLY WRENCHES

NO CAULKING MATERIALS

NO GASKETS. NO BELL HOLES TO DIG.



**For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.**

*Dept. C*
**THE CENTRAL FOUNDRY COMPANY**
**386 FOURTH AVENUE, NEW YORK 16, N. Y.**

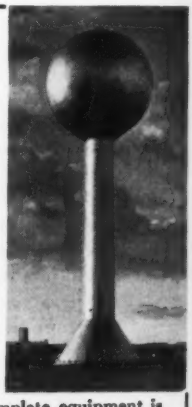
**Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.**

**NAME**_____

**STREET**_____

**CITY**_____

**Prevent Rusting**



**Rusta Restor cathodic protection, provides *permanent protection* against rusting of water tanks, piping and steel structures of all kinds.**

**Initial cost of a complete equipment is about equal to the cost of a good paint job. . . . Operation costs only about 2 mills (i. e. $0.002) per year per square foot of surface protected.**

**If your tanks and steel structures are not now protected by this proven low-cost method, they should be. No obligation. Send for fully descriptive literature today.**

**RUSTA RESTOR**
**Division of**
**THE JOHNSTON & JENNINGS CO.**
**862 Addison Road Cleveland, Ohio**

# "Immediate INCREASE in REVENUE

**will result from almost any investment in *meter maintenance*"**

**MR. CLYDE BRUCK**
*Meter Repair Foreman*
CINCINNATI, OHIO, WATER WORKS

*Indian Hill Tank, Cincinnati, Ohio*

If you allow your meters to become inoperative before being removed from service you may have the same experience as the Cincinnati Water Works. When, on a survey, they tested 40 water meters from a typical residential street, 36 of them would not even move on ¼ gallon per minute.

When you remember that 13% of all water used in domestic service is around ¼ gallon per minute or less, it is not hard to see the importance of regular meter testing and repair in protecting your revenue.

● *Trident representatives, in traveling their territories, have obtained a practical knowledge of meter shop practice, and will be glad to assist you with your plans.*

B4

**NEPTUNE METER COMPANY • 50 West 50th Street • New York 20, N.Y.**
Branch Offices in CHICAGO. SAN FRANCISCO. LOS ANGELES. PORTLAND, ORE.. DENVER. DALLAS. KANSAS CITY. LOUISVILLE. ATLANTA. BOSTON.
Neptune Meters. Ltd.. Long Branch. Ont., Canada

(*Continued from page 18*)

**Theodore Reed Kendall,** former Consulting Editor on *The American City,* is now Editor of *Contractors and Engineers Monthly,* New York City.

**Fred B. Earp,** former draftsman with the City Water Dept., Durham, N.C., was recently released from the Sun Valley Hospital where he was sent after a year at an advance base on one of the Islands in the South Pacific. After a 30-day recuperation leave, he will return to active duty.

He is a Chief Carpenter's Mate in the Seabees, and while in the South Pacific had charge of a water and ice supply unit which filtered and chlorinated approximately 75,000 gallons of water a day.

**Walter M. Franklin,** of Charlotte, N.C., has been commissioned Captain in the Sanitary Corps, and is now undergoing a 6-week training course at Carlisle Barracks, Pa. Capt. Franklin was a Fuller Award winner in 1942.

**Andrew Gutierrez,** former Chemist, Durham, N.C., is now a Sanitary Engineer in the Post Engineer's Office at Camp Mackall, N.C.

**J. C. Cochrane,** Buffalo Dist. Mgr. of Wallace & Tiernan, now has his headquarters in the Wallace & Tiernan general office in Newark, N.J.

**D. C. Taylor,** formerly associated with the Walkerville, Ont., Water Utilities Com., is now Office Manager at the Windsor Utilities Com., Water Div., Windsor, Ont.

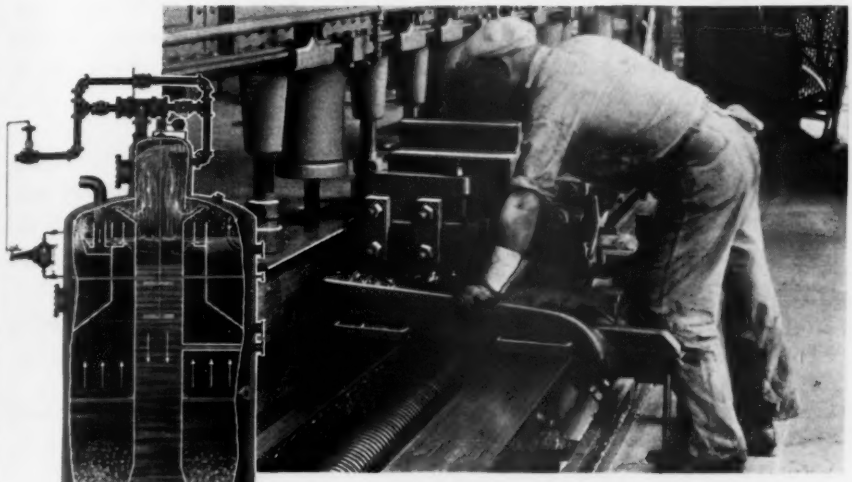
**I. M. Glace Jr.,** former designing engr. with J. N. Pease & Co., Charlotte, N.C., is now somewhere in the Pacific with the Seabees. He joined in February 1943, holds the rank of Ensign, and took his training at Camp Peary, Va., and Camp Endicott, R.I.

**The 26th Annual Texas Water Works and Sewerage Short School** will convene at Texas A. & M. College, College Station, Tex., Jan. 31-Feb. 2, 1944.

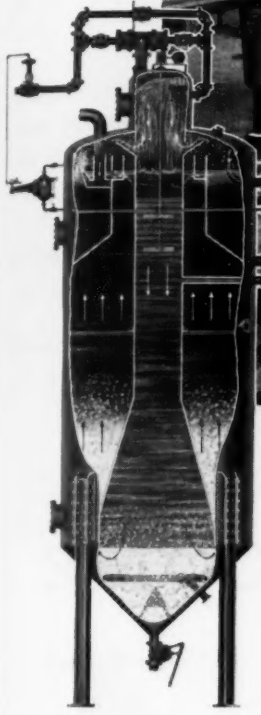
Scheduled are discussions on: priorities; the function of the Office of War Utilities; use of idle equipment; manpower problems; postwar planning; the U.S. Public Health Service standards for drinking water; water supply security; in-service training of water and sewage plant operators; the latest developments in the relation of poliomyelitis transmission and sewage; the relation of Army and Navy standards to the operation of municipal utilities; and new developments in various fields.

(*Continued on page 44*)

# WE'RE *helping to keep hundreds of plants rolling!*



*Planing a steel plate in preparation for welding.*



The drawing above shows a cross-section view of the Graver Hot Process Water Softener with Deaerating Equipment. Like all Graver Water Conditioning Equipment, it can be built in any size to meet your specific requirements.

THE STEAM generating plant is the heart of the community and it must be kept at peak efficiency without interruption. Time out for boiler tube cleaning or repairs means a drop in available power, to say nothing of the resultant delays and expense.

In hundreds of municipalities, Graver Hot Process Water Conditioning Equipment is preventing such interruption by supplying properly conditioned boiler feed water to the steam generating plant. This equipment softens raw water make-up and deaerates make-up water and condensate returns. It reduces hardness, thus eliminating scale-forming solids, and prevents corrosion by eliminating free carbon dioxide. It is power insurance . . . as essential to post-war progress as it is to today's war effort.

Whether yours is a need for today or merely a plan for the future, consult Graver . . . now. Our engineers will gladly discuss your problems with you and submit recommendations and estimates without obligation.

*Water Conditioning Division of*

GRAVER TANK & MFG. CO., INC.

4809-45 Tod Ave., East Chicago, Ind.

NEW YORK CATASAUQUA, PA. CHICAGO TULSA

GRAVER

WATER CONDITIONING EQUIPMENT

Hot Process Water Softeners • Zeolite Water Softeners • Water Filters • Oil Removal Filters • Taste and Odor Removal Filters • Chemical Proportioning Equipment • Filtering Material • Reactivators

43-49W

(*Continued from page 20*)

**The Delaware Valley Utilities Co.** and the Union Water Service Co. have been absorbed by the Northeastern Water and Electric Corp., and the name changed to Northeastern Water Co., with corporate offices at 100 W. 10 St., Wilmington. Northeastern has disposed of the electric and gas companies it formerly owned, and the Northeastern Water Company is now the sole owner of Northeastern Water and Electric Service Corp., its principal management company, whose general offices are at 21 West St., New York.

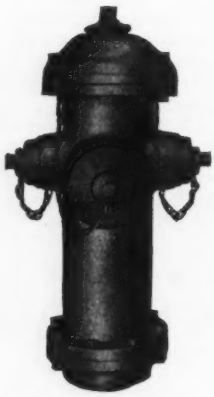
**E. M. Allen** has retired from the presidency of the Mathieson Alkali Works, Inc., and is succeeded by G. W. Dolan. Allen will continue to hold his office as Chairman of the Board of Directors of the company. He had served as President since 1919, and was made Chairman of the Board in 1938.

Dolan joined the Mathieson organization in 1930, and after holding various executive positions was elected Executive Vice-President in 1941.

**The six-month supplement** to the May 1943 *List of Inspected Electrical Equipment* has been issued by the Underwriters' Labs. of the Natl. Bd. of Fire Underwriters, 207 East Ohio St., Chicago 11.

(*Continued on page 46*)

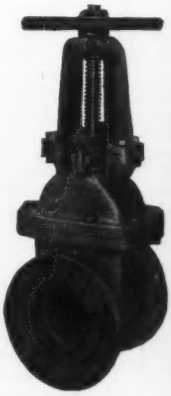
PEACE *WILL* COME



**And you undoubtedly are now considering equipment for your POST WAR PROJECT.**

**As the *final* test of merit, we invite you to "ask the man who uses RENSSELAER."**

**Write for Bulletins X and W giving complete data on Valves and Hydrants.**



RENSSELAER VALVE CO.

TROY, N. Y.

# HYDRO-TITE

## AND DRY BRAIDED FIBREX

**A DEPENDABLE SELF-CAULKING JOINT COMPOUND FOR CAST IRON BELL AND SPIGOT WATER MAINS**

**HYDRO-TITE** is a self-caulking sulphur base jointing compound used to joint bell and spigot cast iron water mains and soil pipe. It comes in powder form which insures uniformity and quick melting.

When poured into a joint, HYDRO–TITE immediately solidifies upon contact with the metal and bonds to both the surfaces of the bell and the spigot for the entire depth of the joint. It requires no caulking and after pouring a joint, water pressure may be immediately applied.

**HYDRO-TITE** is easy to use, no skill being required to make joints that are tight from the start. Joints made with HYDRO–TITE will stand any pressure the pipe will stand.

**DRY BRAIDED FIBREX**

### USED LIKE BRAIDED JUTE WILL NOT BREED BACTERIA

**A SANITARY** Packing used in jointing bell and spigot pipe for water, sewer mains and soil pipe.

**FIBREX** was designed for use with Hydro-Tite and other self-caulking compounds, but is entirely suitable also for joints made with lead, and for Sani-Tite and other asphalt sewer joint compounds. Thousands of pounds of Fibrex are already in service on water lines throughout the country.

## HYDRAULIC DEVELOPMENT CORPORATION

**Main Sales Office: 50 CHURCH STREET, NEW YORK, N. Y.**

**Works: WEST MEDFORD STATION, BOSTON, MASS.**

GREENSAND

*Engineering service, designs, equipment, and construction for water supply and water purification works of all kinds.*

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

**ZEOLITE CHEMICAL CO.**
**90 WEST STREET** **NEW YORK, N. Y.**

(*Continued from page 44*)

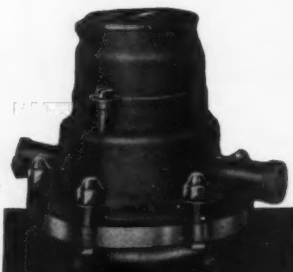
**More than 1,000 analyses** of composites of daily samples collected for a year at 23 river stations, mostly in the Colorado River and Pecos River Basins, are given in series in Water-Supply Paper 942 of the U.S. Dept. of the Interior, Geological Survey. The paper is entitled "Quality of Surface Waters of the United States, 1941," compiled by W. D. Collins, C. S. Howard, and S. K. Love, and costs 15¢. It is the first in a series of annual reports.

In addition to the tables of comprehensive analyses of composites and of single samples, there are several tables that give the results of measurements of dissolved solids, conductance, or chloride made in connection with special studies.

**New offices** of Pittsburgh Equitable Meter Co.–Merco Nordstrom Valve Co. have been opened at 411 Bona Allen Bldg., Atlanta, Ga. C. C. Moore, who has been in charge of the company's Memphis office, is Dist. Mgr. The Memphis office will be closed at the end of December, so all southern operations formerly cleared through Memphis will now be handled at Atlanta.

(*Continued on page 48*)

**NIAGARA IRON CASE WATER METERS**



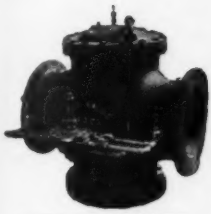
provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

**WRITE FOR CATALOG.**

**BUFFALO METER COMPANY**
Established 1892 2914 Main St., Buffalo, N. Y.

# 1879—ROSS—1879

## AUTOMATIC VALVES

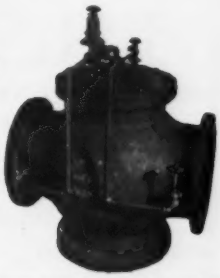


ALTITUDE VALVE

Controls elevation of water in tanks, basins and reservoirs

1. Single Acting
2. Double Acting

Maintains safe operating pressures for conduits, distribution and pump discharge



SURGE-RELIEF VALVE

REDUCING VALVE

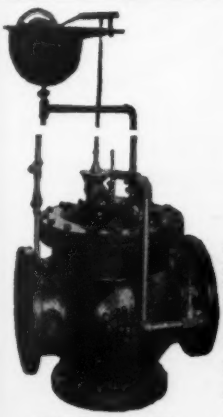
Maintains desired discharge pressure regardless of change in rate of flow

Regulates pressure in gravity and pump systems; between reservoirs and zones of different pressures, etc.

A self contained unit with three or more automatic controls

COMBINATION VALVE

Combination automatic control both directions through the valve.

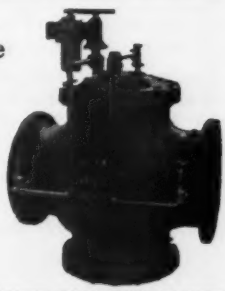


FLOAT VALVE

Maintains levels in tank, reservoir or basin

1. As direct acting
2. Pilot operated and with float traveling between two stops, for upper and lower limit of water elevation.

Electric remote control—solenoid or motor can be furnished



REMOTE CONTROL VALVE

Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

*Packing Replacements for all Ross Valves Through Top of Valve*

**ROSS VALVE MFG. CO., INC., P. O. BOX 593, TROY, N. Y.**

(*Continued from page 46*)

## REPORT OF NORTH CAROLINA MEETING

The 23rd Annual Conference of the North Carolina Section was held at the Hotel Robert E. Lee, Winston-Salem, N.C., November 2–3. 202 delegates including 25 ladies were officially registered. Vice-Chairman J. R. Purser Jr. presided in the absence of the Chairman, W. H. Hall, who was detained by his duties as Dean of Engineering, Duke University.

J. D. McConnell, Proximity Mfg. Co., Greensboro, N.C., spoke on "Maintenance of Machinery under Today's Conditions." McConnell based his discussion on maintenance problems solved by his company.

"Ground Water in the Halifax, N.C., Area" was the title of a paper presented by Dr. J. L. Stuckey, N.C. State Geologist. The author traced the development of ground water resources in the Halifax area. E. D. Burchard, Dist. Engr., U.S. Geological Survey, Raleigh, N.C., formally discussed Dr. Stuckey's paper.

At the annual business meeting Tuesday afternoon the following officers were elected: Ch., J. R. Purser, Jr.; Vice-Ch., E. M. Johnson; Secy.-Treas., R. S. Phillips; and Trustee, D. M. Williams.

(*Continued on page 50*)

BLUEPRINT *NOW*
FOR PEACE

**Many communities today are reducing post war construction plans to the blueprint stage in order to speedily re-employ returning soldiers and war workers, as well as hasten postponed developments.**

**Peerless engineering data and service are available to any municipality now planning for the future use of pumps. Because Peerless Pump capacities range from 10 to 20,000 gallons per minute, and embody the latest engineering techniques, they should be the first to be considered for any pump job, now or in the future.**

***Tell us your requirements.***

**PEERLESS PUMP DIVISION**
**of Food Machinery Corporation**
**301 W. Avenue 26, Los Angeles, 31, Calif.**
**1250 W. Camden Ave., S. W., Canton, 6, Ohio**
**OTHER FACTORIES:**
**San Jose 5 and Fresno 16, Calif.**
*Service Offices & Special Agents in Principal Cities*

**PEERLESS PUMPS**

**Meter Boxes**
**Meter Testers**
**Meter Yokes & Couplings**
**Valve Boxes**
**Service Boxes**
**Manhole Covers**
**Street Castings**
**Special Castings**

**H. W. CLARK COMPANY**
**Mattoon, Illinois, U. S. A.**

# CAST IRON PIPE

*Manufactured in Sizes 2" to 96"—*
*A large stock constantly on hand,*
*facilitating prompt shipment.*

**Flanged Pipe**

**Special Castings**

**Flexible Joint Pipe**

**Bell and Spigot Pipe**

**Warren Spun Centrifugally Cast Iron Pipe**

**Short Body B. & S. Specials**

WF

## Warren Foundry & Pipe Corp.

*and*

**Warren Pipe Co. of Massachusetts, Inc.**

*Sales Offices*
11 BROADWAY, NEW YORK, N. Y.
75 FEDERAL ST., BOSTON, MASS.

*Works*
PHILLIPSBURG, N. J.
EVERETT, MASS.

(*Continued from page 48*)

Probably the largest attendance ever recorded at a technical session at a N.C. Section Meeting was on hand to hear J. Grant Frye, Attorney, Cape Girardeau, Mo., tell of his experiences in "Battling the Tank Repair Racket." Frye exposed case after case where he stated it had been proven that the concern in question had conducted what he referred to as a "rivet-removing racket."

"As the Gentle Rain," a beautiful sound color movie, was shown through the courtesy of the Hackensack Water Company. This movie has been shown at several other section meetings as well as at the Cleveland Conference as an example of one of the best ways of "telling the water works story to the public."

Principal speaker at the annual dinner was Charles H. Campbell, Press-Secy. to the British Embassy. Campbell's topic, "An Englishman Goes Home," dealt with his experiences on his recent trip to England. He emphasized the importance of water supply and auxiliary reservoirs to Britain under air attack.

W. W. Brush, Treas., A.W.W.A., announced that the selectee for the Fuller Award was William M. Piatt, Cons. Engr., Durham, N.C. The

(*Continued on page 52*)

WATER REFINING
EQUIPMENT HEADQUARTERS
INDUSTRIAL—PROCESS
RAILROAD—MUNICIPAL—HOUSEHOLD

**FILTERS** Of All Types *and* Capacities . . . Gravity . . . Pressure

**SOFTENING SYSTEMS**
All Types *and* Capacities—Zeolites (*synthetic and natural*) and Lime and Soda

**CHEMICAL FEEDERS** (wet or dry)
Acids . . . Hypochlorites . . . Alkalies

**EQUIPMENT FOR REMOVAL**
Of Iron . . . Taste . . . Odors . . . Colors . . . Suspended Matter

SWIMMING POOL EQUIPMENT
AERATORS · DE-GASIFIERS
WATER TEST SETS
RE-CARBONATORS

*The* AMERICAN WATER SOFTENER COMPANY
WATER REFINING EQUIPMENT HEADQUARTERS
INDUSTRIAL · PROCESS · RAILROAD · MUNICIPAL
HOUSEHOLD ETC.
322 LEHIGH AVE., PHILA., PA.

Vogt Fire Hydrants

Standard—
"Traffic Model"—
Flush Type—
Water Crane—
Type

Vogt Gate Valves

Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit any Type Pipe.

Also—Floor Stands, Shear Gates—Tapping Sleeves and Valves, Flap Valves and Mud Valves.

Vogt Brothers Mfg. Co.
INCORPORATED
MAIN AT 14th ST.
LOUISVILLE KENTUCKY

# HELLIGE TURBIDIMETER

This instrument can be used not only for turbidimetric analyses of water but also for sulfate determinations and measurements of suspended matter in various colorless or colored liquids, as found in many industries. Standard suspensions are not needed. Operates on the Tyndall principle. Determinations are made rapidly and with exceptional accuracy.

HELLIGE, INC.

3718 Northern Boulevard
Long Island City 1
New York

COOK Well Strainers

A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.

Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 50*)

citation reads: "In recognition of his sound engineering skill and successful achievements in the field of water purification and distribution over a period of more than forty years; for his tireless efforts in behalf of the North Carolina Section, its members, as well as all its activities, since its organization in 1921." Mr. Piatt is the North Carolina Section's Director and a Past-Chairman.

Wednesday morning's program was devoted to problems and research in sewage treatment. D. York Brannock gave a paper on "Sewage Treatment at Rocky Mount." P. L. Abernathy gave the details of "The City of Hickory's Rose Garden." Finally Professor Samuel H. Hopper gave the results of his research on "Modifications of the Relative Stability Test."

"Stop Waste—Broad Conservation Program and Priorities Regulations Affecting Water Works" was the title of H. Lloyd Nelson's address. Nelson acknowledged the great assistance given the WPB by the A.W.W.A. in the development of the plan for water conservation. Following his outline of the "Stop Waste" plan, Nelson explained the recent revisions in WPB public utilities orders. H. E. Beckwith and Fred E. Stuart urged operators to check pump efficiencies as a conservation measure.

"Presentation of Plans of the Joint Committee on Water and Sewage Works Postwar Developments" was given by A.W.W.A. Vice-Pres., Samuel F. Newkirk as the concluding feature on the technical program Wednesday afternoon. Newkirk outlined the activities of the Committee and indicated that financing postwar public improvements will have to be largely borne by local communities. Charles H. Becker, a member of the committee, in the discussion expressed the belief that the re-employment of excess manpower would be postwar problem No. 1. J. W. Kellogg, Raleigh, N.C., advocated government sponsored postwar education for returning service men.

R. S. PHILLIPS
*Secretary-Treasurer*

***PREVENT WEAR AND CUTTING of rods, plungers and shafts by using***

MABB'S

**MABBS RAWHIDE PACKING**

**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**

# NEWS OF THE FIELD

**"The War Department and the Office of Civilian Defense** has announced the elimination of practice air raid alerts and blackouts, involving public participation, except in coastal areas," the Office of War Information tells us. "Along the Atlantic and Pacific coasts such alerts and blackouts will be authorized not oftener than once in three months, and then only on a Sunday. However, the War Department has issued instructions that its field agencies must be prepared to reactivate air raid drills, and civilian defense personnel and the public must also be prepared to engage in more active training in the event the strategical situation changes in such manner as to warrant increased passive defense measures."

The OCD reorganization has also brought about the release of all but two of the sanitary engineers assigned to civilian defense work by the U.S. Public Health Service. One will remain with the OCD headquarters office in Washington and one will remain on duty with the regional OCD office in San Francisco. The various regional sanitary engineers will remain on duty in their present locations to work on the Facility Security Program under R. E. Tarbett. These men will also be available to Civilian Defense agencies as consultants in order to maintain mutual aid arrangements and other phases of the civilian protection program which have permanent value.

The public water supply field has gained greatly from the work done by the OCD. The mutual aid plan had served water works in some areas long before the war began. But civilian defense lessons learned in England made it desirable to extend mutual aid organizations over the entire country state by state.

It is profoundly hoped that the mutual aid plan of action will not be allowed to lapse, but that state sanitary engineers who now enjoy the confidence of water works executives will continue to give mutual aid plans the leadership they need in the interest of public safety in times of disaster.

(*Continued on page 2*)

(*Continued from page 1*)

**Grant S. Bell,** Cons. Engr. in the firm of Howard K. Bell, Lexington, Ky., has been commissioned Captain in the Sanitary Corps and is at present stationed at Camp Campbell, Clarksville, Tenn.

**James K. Latham,** Cons. Engr. of Lexington, Ky., where he is partner in the firm of Howard K. Bell, is now in England as a Captain in the Sanitary Corps.

**Bruce P. Barber,** former Munic. Engr. at Columbia, S.C., is now a Captain in the Sanitary Corps and is posted at the Station Hospital at Fort McClellan, Ala.

**Maj. Fenner H. Whitley, Sn.C.,** is now in the Civil Affairs Section of the Provost Marshall General at Yale University. He was transferred there from the Headquarters Station Hospital, MacDill Field, Fla.

**Ensign John C. Gearhart,** former Jr. Engr. with Stevens & Koon, Portland, Ore., is now "somewhere in the Atlantic" with the Seabees.

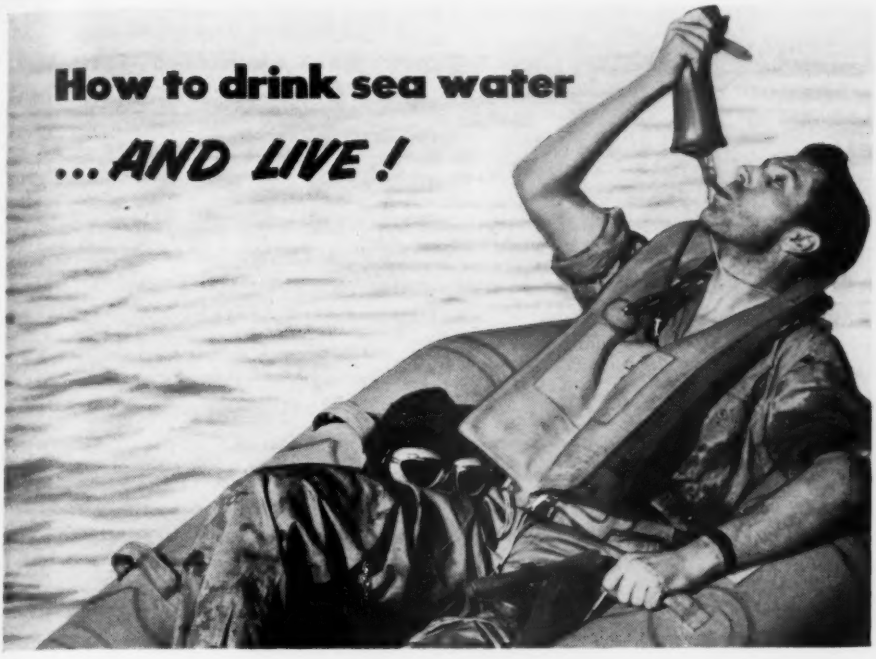
**Lt. Comdr. Joseph P. Lawlor,** Pres., General Filter Co., Ames, Iowa, is the Commanding Officer of the Seabees Training Center at Camp Pendleton, Oceanside, Cal. He is at present on temporary duty, attending the 4th Command & Staff School, Marine Corps School, Quantico, Va.

(*Continued on page 4*)

**James Ashworth,** Chief Engr. of the Waukegan, Ill., Water Works System No. 2 and Supt. of the Water Filtration Plant, died on December 26. Ashworth went to Waukegan in 1927 to be Resident City Engr. and supervise the construction of the water works, June 1927–January 1929. He had supervised its operation ever since.

Prior to 1927, Ashworth was Chief Sales Engr. of the Allis-Chalmers Co., Milwaukee, in which capacity he supervised erection of numerous large steam water pumps. He also was an engineer with the Foundation Co., New York. For a number of years he was Chief Water Works Engr. for the Lakeview Pumping Station, Chicago.

Ashworth was born in Chicago, November 22, 1878. He held an engineering degree from the Illinois Institute of Technology, Chicago, and a law degree from the Lake Forest School of Law. He was a member of the Bar. He was a Past President of the West Shore Water Producers' Organization, which he helped to found in 1930.




FORCED down at sea, this pilot will live to fly and fight again, because thirst—age-old enemy of shipwrecked men—has been conquered. Now he can drink sea water!

Packed with his deflated life-raft, the flyer carries a compact Permutit Sea-water Desalting Kit. Adrift, he simply scoops up sea water in a plastic bag, drops in a small briquet and in a few minutes the water—fresh and clear—is ready to drink. The briquet precipitates the dissolved salts, which are then filtered out as the flyer sucks the water through a tube. Each briquet in his supply will freshen enough water to keep him alive for a day. The whole operation is so simple that it can easily be carried out by a man on a life-raft.

The problem of developing a practical de-salting method was early recognized by Permutit. Here at water conditioning headquarters, chemical engineers worked intensively on it for months and the final product was acceptable to the U. S. Navy, Army and Air Transport Command. The successful result adds one more field to the many in which Permutit's long experience in water treatment is serving our country at war. The Permutit Company, Dept. G2, 330 West 42nd St., New York 18, N. Y. In Canada: Permutit Company of Canada, Ltd., Montreal.

**PERMUTIT**

**WATER CONDITIONING HEADQUARTERS**

(*Continued from page 2*)

**Robert S. Phillips,** Chief Chemist of the Durham, N.C., Water Dept., and Secretary-Treasurer of the North Carolina Section, A.W.W.A., reported to Carlisle Barracks, Pa., on January 27 for six weeks training. He takes the rank of First Lieutenant.

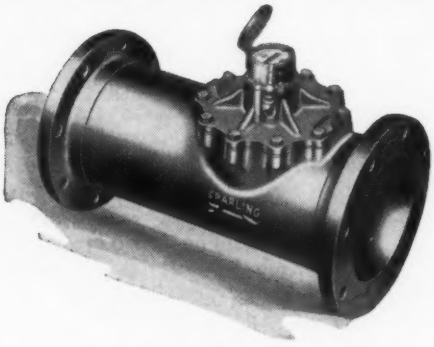
**Francis B. Marsh,** who recently retired as Sr. Div. Engr., Eastern Div., Board of Water Supply, New York, N.Y., has been appointed Associate Editor of "Water Works Engineering." Marsh has been active in the water works field for the past 40 years.

**Joseph J. Gilbert,** San. Engr. of Abington, Pa., has been promoted from the rank of Major to that of Lieutenant Colonel, S.C. He is now Assistant Director of the Sanitary Engineering Division, Surgeon General's Office.

**Franz J. Maier,** former Asst. San. Engr. in the office of the Dist. Dir., Dist. No. 1, U.S. Public Health Service, became Director of the 2nd District, with headquarters at Bethesda, Md., on January 15.

(*Continued on page 6*)


**SPARLING MAIN-LINE METERS**



**For All Main-Lines 2-Inch and Over**

***Bulletin 308 will come upon request***

SPARLING Meters are simple to install for lasting accurate service. They give Direct Totalization over a wide range of flows.

The propeller mechanism is mounted in tubes—flanged, bell & spigot, or threaded; or is saddle mounted on the line. Flow-rate indication and recording are optional; also treatment controls.

R. W. SPARLING

*Manufacturer of Water Measuring Equipment*

LOS ANGELES 54.....Box 3277 Terminal Annex
CHICAGO 16.....3104 South Michigan Ave.
622 Broadway.....CINCINNATI 2
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# Again you can get Cast-Iron Pipe

## FOR THE

# DRESSER BELLMASTER JOINT

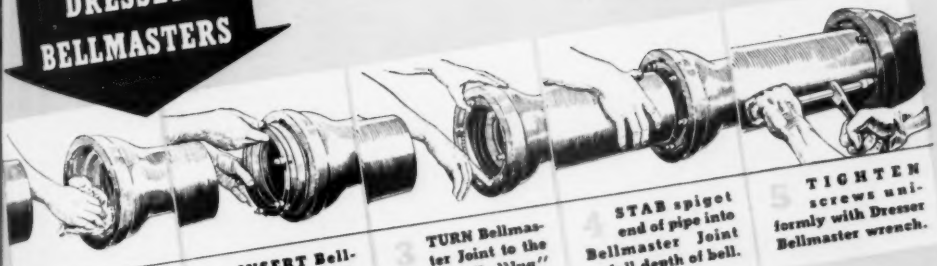
Remember in 1941 when the new Dresser Bellmaster Joint—Style 85—was first introduced? Superintendents and maintenance men saw at a glance that here was a faster, better way to join cast-iron pipe. Hundreds sent for a sample joint. Subsequent installation proved its superiority.

Then came the War and cast-iron pipe manufacturers, doing an urgent War job, were unable to change over and expand facilities to furnish the special pipe needed for the Bellmaster. Today, the situation has improved. Makers are now able to deliver Bellmaster pipe. And we are ready to ship these new Dresser mechanical joints promptly in 4″, 6″, 8″, 12″ and 16″ CIP sizes (about one month for 10″ size).

Almost ten million men are at War and manpower is at a premium. This is the opportune time to standardize on the fastest cast-iron pipe joint on the market. It comes in one piece, easy to handle, easy to store. Light, tight, strong, flexible, it offers unfailing service and pipe-line protection to cast-iron pipe users. Investigate the Dresser Bellmaster. Catalog on request.

**Dresser Manufacturing Company**
*Affiliated with Dresser Industries*
BRADFORD, PENNA.

**Join CIP Faster and Easier with DRESSER BELLMASTERS**



1 **WIPE** out spigot end of pipe and inside surface of bell in the usual way.

2 **INSERT** Bellmaster in bell-end of pipe with cap-screws facing out.

3 **TURN** Bellmaster Joint to the right until "lug" hits stop in bell.

4 **STAB** spigot end of pipe into Bellmaster Joint to full depth of bell.

5 **TIGHTEN** screws uniformly with Dresser Bellmaster wrench.

(*Continued from page 4*)

**D. McGregor Williams,** Supt. of the Durham, N.C., Water Dept., has been appointed to take the place of R. S. Phillips as Secretary-Treasurer of the North Carolina Section.

**Charles H. Starling** has been promoted to Captain, C.E., and transferred from the office of the Post Engineer at Camp Butnor, N.C., to an Engineer Water Supply Company at Fort Lewis, Wash.

**Fred A. Eidsness,** Chairman of the Florida Section, A.W.W.A., has been promoted from Assistant to Associate Sanitary Engineer in the Florida State Board of Health, Jacksonville.

**R. E. Ramseier,** formerly of Berkeley, Calif., is now Chief of the Sanitary Engineering Section, Office of the Service Command Engineer, 9th Service Command, in Salt Lake City, Utah.

**C. W. Smedberg,** former Regional Engr. in the Water Div. of the Office of War Utilities, WPB, is now Assistant Director for Administration in the Federal Public Housing Authority, and is stationed in Atlanta, Ga.

(*Continued on page 8*)

**FIRST on the Water-front**

—at War and at Home

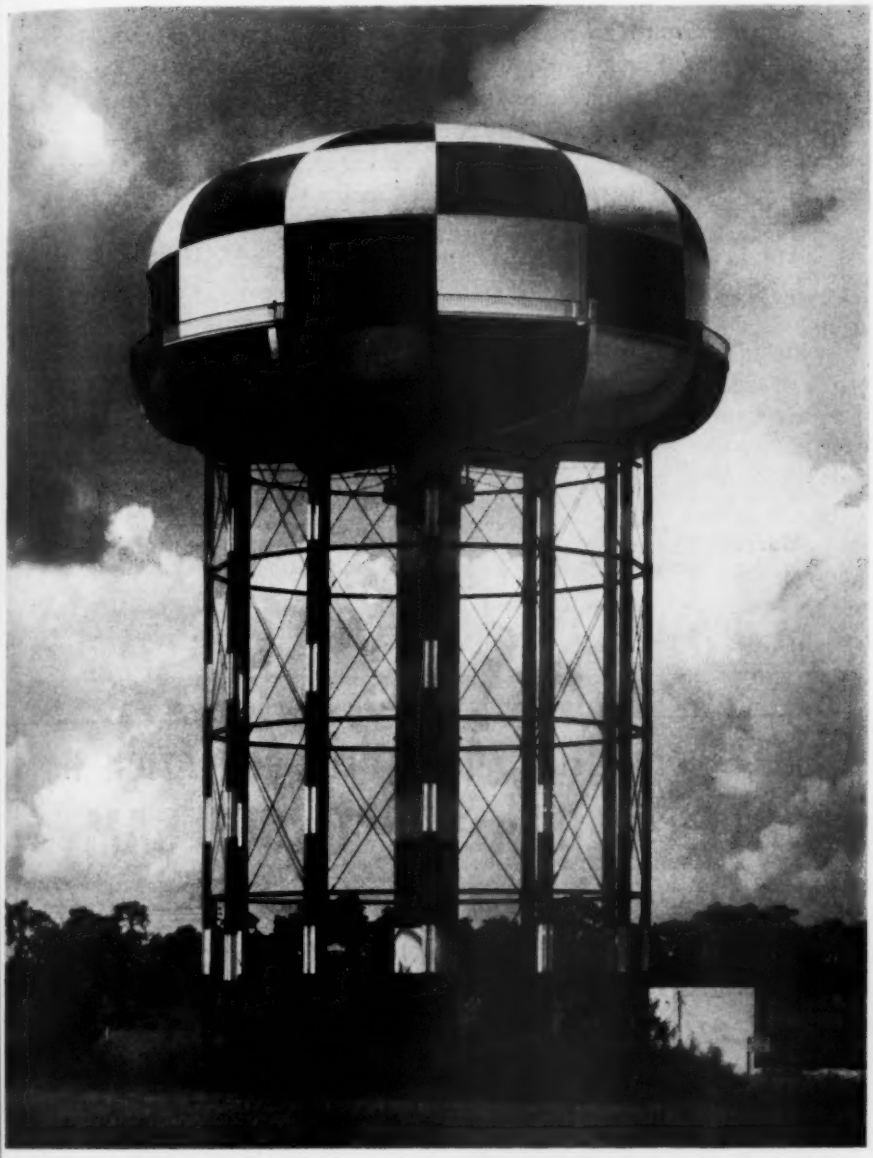
PEERLESS PUMP DIVISION
FOOD MACHINERY CORP.
LOS ANGELES 31, CAL.; CANTON OHIO
SAN JOSE 5 AND FRESNO 16, CAL.

★ WATER OR OIL LUBRICATION
**Peerless**
**TURBINE PUMPS**

**FORGET ME NOT!**

I am the COPPERHORN, out for the duration because of the Copper Conservation Order.—BUT I am the best fitting for a basement water meter setting that has been devised to date. Learn more about me and when you plan on your future meter installations, FORGET ME NOT!

**FORD METER BOX CO.**
**WABASH, IND.**



**TAMPA, FLORIDA,** installed this 1,500,000-gal. radial-cone elevated tank to maintain gravity pressure on a new transmission main supplying the southwestern portion of its water system.

**CHICAGO BRIDGE & IRON COMPANY**

BIRMINGHAM
PHILADELPHIA
SAN FRANCISCO
CHICAGO
NEW YORK
HOUSTON
WASHINGTON
CLEVELAND
TULSA

(*Continued from page 6*)

**Capt. Edward E. Smith,** former Genl. Supt. of Water and Sewage Treatment, Lima, Ohio, and consulting engineer in that town for 19 years, is functioning in an advisory capacity on the Allied Control Commission in North Africa. Capt. Smith, who is a graduate of M.I.T., was a consulting chemist and engineer at Charleston, W. Va., and did research in Milwaukee and on the Ohio River at Cincinnati before going to Lima.

**David H. Caldwell,** Dir. of the Research Lab., Bur. of San. Eng., Calif. State Dept. of Health, is on leave of absence from that position in order to serve with the Repairs and Utilities Branch of the 9th Service Command. He is located in Salt Lake City, where he is engaged on water and sewage treatment. In California, he did research investigations on sewage treatment processes, such as ponding of sewage effluents, biofilters, etc., and on a specialized apparatus for B.O.D. determinations. He was also engaged on laboratory studies of treatment of food dehydration wastes.

**Garrett Sloan,** San. Eng. in the U.S. Public Health Service, is now in the U.S.P.H.S. office in Juneau, Alaska.

(*Continued on page 10*)

**FULL PRODUCTION for**
**WATER WORKS**

We have never relaxed our efforts to supply whatever is needed for your services

*therefore*

We manufacture everything in our line that is authorized by WPB Regulations

**FULL PRODUCTION for**
**UNCLE SAM**

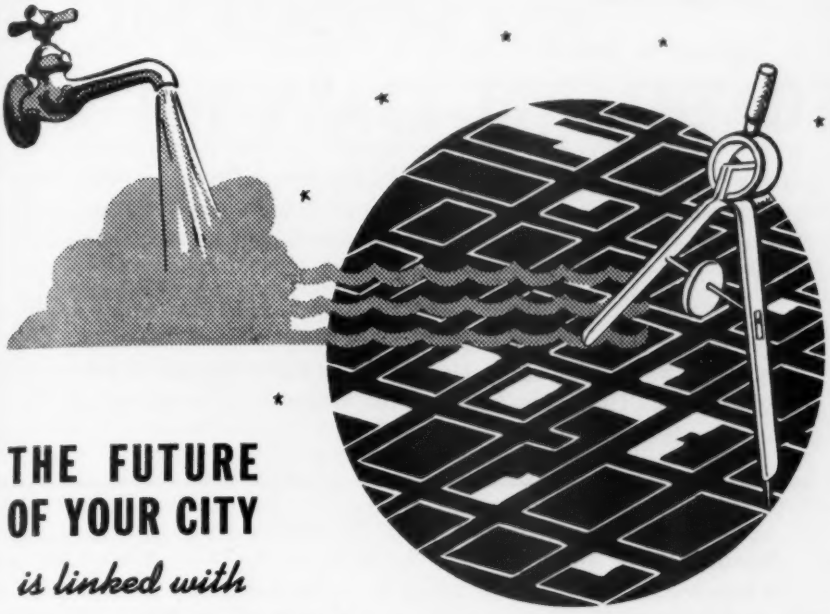
Our facilities are being used to produce specialized items for the Army, Navy, and Air Corps

*and*

This is in addition to our regular line that is urgently needed in the War Effort

*We are proud of our achievement in doing both jobs*

**HAYS MANUFACTURING CO., ERIE, PENNA.**
WATER WORKS PRODUCTS



**THE FUTURE OF YOUR CITY**

*is linked with*

# THE WATER OF YOUR CITY

Soft, iron-free water will contribute much to the future happiness and prosperity of your community. No plan for community improvement is complete without a plan for "better water."

Whether your need is for a softening plant, iron removal units, aeration or filtration equipment, Refinite is prepared to design and build the equipment to meet your specific requirements. Refinite equipment also includes a complete line of chemical feeders and water treating accessories. Many progressive cities throughout the country now enjoy Refinite Conditioned Water.

Refinite laboratory and technical experts are at your command. Call upon them now! There is no obligation!

**The Refinite Corporation**

Write for a Free Catalog 108 Refinite Bldg. Omaha, Nebraska

**Arthur B. Marsden,** builder and operator of the Manchester, Vt., Water Co., died on December 12. Marsden, who was born in Utica, N.Y., in 1874, went to Manchester in 1894 and built its water works. He retired from the management of the company on November 1, 1943, and was succeeded by his son, Howard G. Marsden.

Marsden at one time was operator of the Manchester Light and Power Co., and also, for many years, conducted an electrical contracting business.

Always active in public affairs of the town, Marsden died in Bennington, where he had gone to serve on the County Court, in his capacity as assistant judge. He represented Manchester in the State Legislature in 1925, and held several different town offices, chiefly that of auditor and lister.

(*Continued from page 8*)

**North Emory Bartlett** has retired from the Vice-Presidency of the Pennsylvania Salt Manufacturing Co. Bartlett, who is a native of Easton, Md., and is now residing there, started with the Salt Company in 1894 as a lye salesman in the Chicago office. He went to the Philadelphia office about 30 years ago as a special sales agent and on Jan. 1, 1925, was made General Sales Manager. Jan. 1, 1928, he became Vice President in charge of sales and continued actively in this capacity until Jan. 1, 1942, when he relinquished his duties in charge of sales but remained Vice President with additional duties as Assistant Secretary.

**Larry E. Huck,** formerly associated with the Crane Co., Chicago, is now Advertising and Sales Promotion Manager of the Valve Division of the Clayton Manufacturing Co., Alhambra, Cal., which manufactures check, altitude, float, remote control, and pressure regulating valves, as well as backflow prevention units.

(*Continued on page 12*)

THE COAGULANT
THAT CUTS COSTS

Write today for actual case histories of water plants now using Ferri-Floc.

TENNESSEE CORPORATION
Ferri-Floc
FERRIC SULPHATE

TENNESSEE CORPORATION
ATLANTA, GEORGIA LOCKLAND, OHIO

# ARE YOU DESIGNING NOW FOR THE PEACE-JOB AHEAD?

When Victory is won, the big peace-job must be underway. Millions of returning service men and millions of war workers will want to get back on peacetime payrolls. Industries, utilities and governments (all the way from villages to federal agencies) must be *ready* with their plans.

No doubt you have many needed waterworks extensions and improvements that have been postponed because of the vital need for war materials. These are the job-giving peacetime projects you can plan now.

Before your detailed plans are made ready for the drawing board, we'd like to talk with you about ARMCO Spiral Welded Steel Pipe.

We should like to discuss with you how and why the right design of your waterworks systems with ARMCO Spiral Welded Steel Pipe will assure economical and efficient operation. This means the correct wall thickness, the right diameter, joints, fittings and accessories. And we'd like to tell you about the many practical advantages of this steel pipe in waterworks service.

**WRITE FOR THIS PAPER**

Meanwhile, it will pay you to read a valuable article on *"Outline of Design Factors for Steel Water Pipe Lines."* It was written especially to show the advantages of specific design for every type of pipe line. Write for a copy. It's free. The American Rolling Mill Company, 781 Curtis St., Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION.

ARMCO

**ARMCO STEEL PIPE**

**MEETS A.W.W.A. STANDARD SPECIFICATIONS**

(*Continued from page 10*)

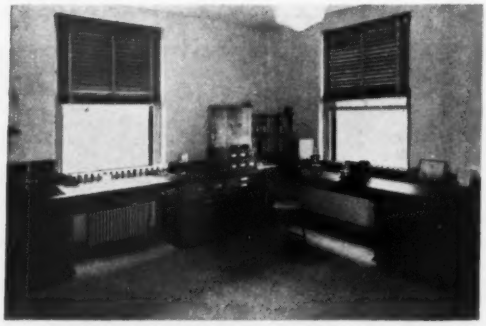
**L. H. Brandt,** formerly with the National Ammonia Div. of DuPont, has joined the Technical Service Dept. of the Pennsylvania Salt Manufacturing Co., Philadelphia. Brandt, who graduated from Ohio State University in 1929, and holds a degree in Chemical Engineering, is the author of numerous engineering articles on ammonia, and in his new position will devote his time principally to rendering assistance to heavy chemical users.

**Lester L. Buzzard,** Sales Mgr. of the Hays Mfg. Co., has transferred from Greenville, S.C., to the Hays office in Erie, Pa.

**Better self-government** can be achieved through greater citizen participation, and citizen participation can be encouraged by the dispersal of information on the workings and progress of the government—with this principal as a point of departure the Connecticut Public Expenditure Council, under Carter W. Atkins, Exec. Dir., has issued a 28-page illustrated pamphlet on *Modernizing Municipal Reports.* A beautiful example for a tyro to be guided by, it explains in simple, yet detailed, terms, how to make a report readable and attractive to the average citizen. Here anyone mak-

(*Continued on page 14*)

**Sheldon . . . WILL HELP YOU**



**Experienced Sheldon Planning and Installation Engineers will assist you in planning, selecting and installing laboratory control facilities which will meet your needs efficiently.**

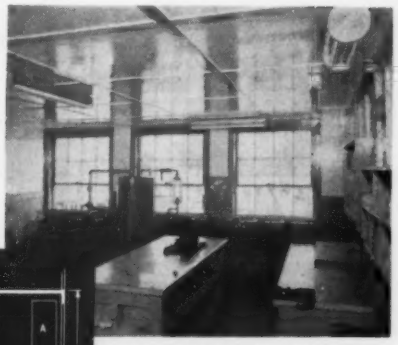
*Write today for our Sheldon Catalog showing Wood and Metal Laboratory Furniture. Ask that a Sheldon Engineer call.*

**E. H. SHELDON & CO.**

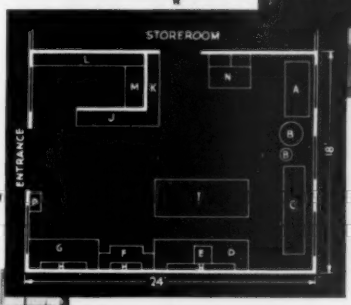
738 NIMS STREET MUSKEGON, MICHIGAN

# Your Meter Shop *deserves careful planning*

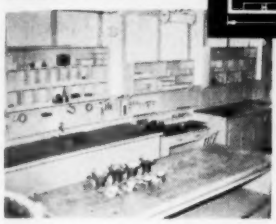
METER TESTING AND REPAIR SHOP
ILLINOIS WATER SERVICE CO.
CchampaIGN, URBANA, ILL.
• *J. A. Mitchell, Foreman*



*Above:* North Elevation of Meter Shop. Cleaning Bench in lower center.




*Below:* Work Bench Section. Center section for Gear Trains and Registers. Note orderly tool arrangement, also special tools, casing, stocker, control block locator, gear train block, etc.



A — Single unit test bench for large meters.
B — Ten cu.ft. and one cu.ft. tanks used with both A and C.
C — Ten unit test bench for small meters.
D — Two space meter repair bench L. 8', W. 30", H. 37".
E — Sink countersunk in above.
F — Small parts bench. For registers, gear trains, etc. L. 5', W. 23", H. 31".
G — Finishing bench for repaired meters L. 6'3", W. 30", H. 37".
H — Wall bins and tool boards containing parts and tools for use at respective benches.
I — Service bench used in conjunction with D. L. 8', W. 36", H 37". Underneath metal top this bench is divided into four equal shelves thus providing storage for 120 incoming meters and meters in various state of repair.
J — Storage for finished ⅝" meters. Capacity 160 meters.
K — Storage for finished ¾", 1", 1½" and 2" disc meters. Capacity: ¾"-12, 1"-10, 1½"-4, 2"-3.
L — Floor to ceiling, parts storage shelves in alcove, made by J. & K.
M — Double deck shelf for portable test meter and field testing equipment. Also in alcove.
N — Desk and filing cabinet for individual meter records.
P — Electric grinder and polishing wheel.

"A STUDY of the location of various fixtures will show that a minimum of handling is necessary, as the action of both repairing and testing takes place in a comparatively small centralized area."

THIS brief comment by Mr. J. A. Mitchell, Foreman of the Meter Department, indicates the important features of a modern meter repair shop in the mind of an experienced operator—features designed to "facilitate repair and testing in view of the trend toward more accurate registration at the minimum flows and . . . to enlarge our production capacity for a program . . . proven to be essential."

• *Mr. Mitchell may be justly proud of his repair shop, and we are proud of the part that Trident representatives had in working with him.*

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**NEPTUNE METER COMPANY • 50 West 50th Street • New York 20, N. Y.**
Branch Offices in CHICAGO. SAN FRANCISCO. LOS ANGELES. PORTLAND. ORE., DENVER. DALLAS. KANSAS CITY. LOUISVILLE. ATLANTA. BOSTON.
Neptune Meters, Ltd., Long Branch, Ont., Canada

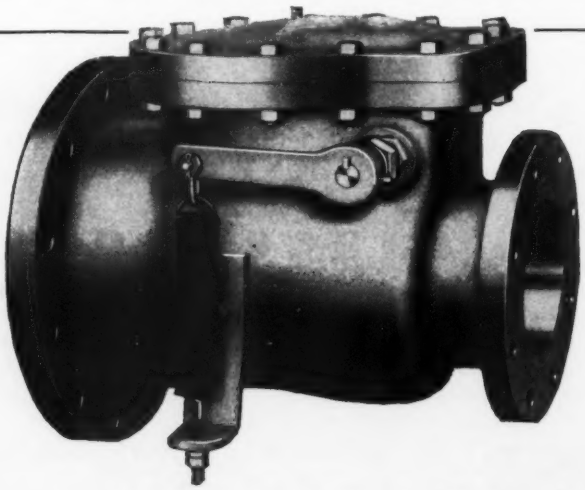
(*Continued from page 12*)

ing up a report to his public, whether it is a town report or a report on the water supply department, will find what to put in, what to leave out, how to generate word appeal and eye appeal, how to produce the report, and how to illustrate it. Great stress is laid on the use of graphs and of simple, direct, and friendly language. The report should be dressed up as fashionably as possible, typographically speaking, in much the same way that business men package or advertise their products.

More detailed assistance will be given to any local government official in the state of Connecticut who requests it. Limited numbers of the booklet are available to all comers gratis. A nominal charge will be made for orders in large quantities. The Connecticut Public Expenditure Council is located at 21 Lewis St., Hartford 3, Conn.

**The 7th Annual Midwest Power Conference,** featuring the theme, "Power Brings Victory," will be held April 13 and 14 at the Palmer House, Chicago. Among the speakers will be J. A. Krug, Dir. of the Office of War Utilities, WPB, who will address the All-Engineers' Dinner, and Alex B. Bailey, Asst. to the Vice-Pres., Commonwealth Edison Co., Chicago.

(*Continued on page 16*)



**RENSSELAER**

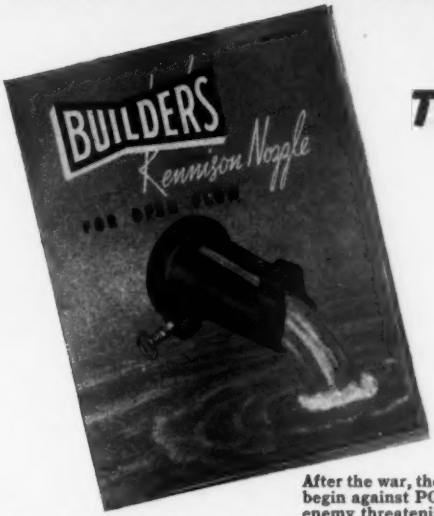
**LIST 340**

**Clearway Quiet-Closing Check Valves eliminate "SLAM." Made in straight-thru type, as well as expanding outlet type for bolting direct to pump discharge. Write for Bulletin V.**

**RENSSELAER VALVE CO. TROY, N. Y.**

# A FIGHT ON THE HOME FRONT

## AFTER THE WAR

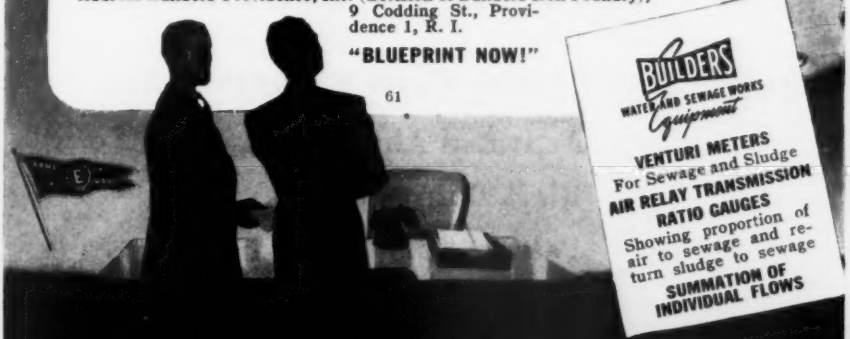



After the war, the battle must immediately begin against POLLUTION, the insidious enemy threatening our national health and comfort. Streams, harbors, and shore lines must be cleaned up. It's time to be making plans and many communities have their engineers at work.

One of the first essentials will be the accurate measurement of sewage flow. Bulletin 334A illustrates and describes the Kennison Nozzle for measuring sewage flow in open channels or partially filled pipes. A postcard brings your copy. Address Builders-Providence, Inc. (Division of Builders Iron Foundry), 9 Codding St., Providence 1, R. I.

"BLUEPRINT NOW!"

61



BUILDERS
WATER AND SEWAGE WORKS Equipment

VENTURI METERS
For Sewage and Sludge
AIR RELAY TRANSMISSION
RATIO GAUGES
Showing proportion of air to sewage and return sludge to sewage
SUMMATION OF INDIVIDUAL FLOWS

*Sincerely Yours,*

**BUILDERS-PROVIDENCE**

(*Continued from page 14*)

**An examination for appointment** as Assistant Sanitary Engineer and Passed Assistant Sanitary Engineer in the Regular Commissioned Corps of the United States Public Health Service is scheduled to be held at:

| | | | |
|---|---|---|---|
| Chicago, Ill. | February 17, 1944 | Kirkwood, Mo. | March 9, 1944 |
| San Francisco, Calif. | February 28, 1944 | New Orleans, La. | March 22, 1944 |
| Denver, Col. | March 6, 1944 | Atlanta, Ga. | March 25, 1944 |
| | Washington, D. C. April 4, 1944 | | |

Applicants for Assistantships must be between 23 and 32 years old, and have at least 7 years of educational (exclusive of high school) and professional training or experience equivalent thereto; Passed Assistants must be not over 39 years old, and have in addition to the foregoing education 2 years of post-graduate instruction, research or teaching in some specialized branch of sanitary engineering and at least 2 years practice in his specialty. All candidates must be graduates of reputable professional schools granting sanitary engineering degrees.

Applicants should address the Surgeon General, U.S. Public Health Service, Washington, D.C., in their own handwriting.

(*Continued on page 18*)

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**Back the Attack**
**WITH WAR BONDS**

*America's Most Popular Water Works Products*

**Activated Alum**

**Blackalum**

**Palmer Surface Wash Systems**

**(designed, fabricated, installed)**

**Write for details—no obligation.**

STUART-BRUMLEY CORP., 516 N. CHARLES ST., BALTIMORE-1, MD.

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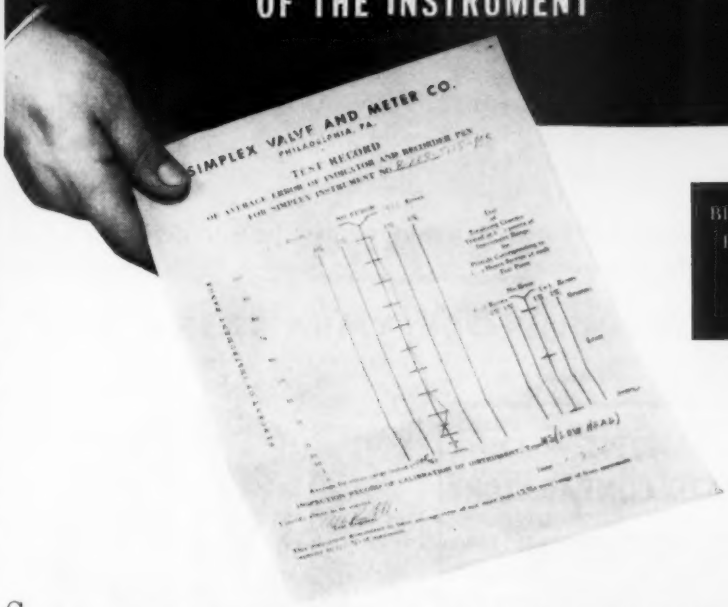
# *Every* SIMPLEX FLOW RATE METER IS TESTED OVER THE ENTIRE RANGE OF THE INSTRUMENT

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Special hydrostatic testing equipment and production laboratory engineers plot a full accuracy curve of every Simplex Meter before it is shipped — and the curve showing the average error for each instrument is sent to the purchaser for his use.

Incremental differential heads are applied to the meter at predetermined percentages of capacity. By means of micrometer adjustment, the exact height of the water column is controlled within the narrowest limits.

This complete routine testing procedure is the final stage of production in the Simplex plant — your assurance that every Simplex Meter is not only accurate within the entire range of the guarantee, but is also specifically tested and inspected over its entire range before being shipped.

Write today for latest literature on Simplex Meters for use in accurately indicating, recording and totalizing rates of flow of liquids and gases encountered in the water, sewerage, process or power fields.

**SIMPLEX VALVE & METER COMPANY**
**6784 UPLAND STREET, PHILADELPHIA 42, PENNA.**

(*Continued from page 16*)

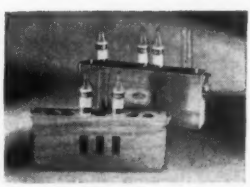
**Philadelphia is blueprinting now,** not only for its postwar projects but also for its postwar financing. Citizens' Business, published by the Bureau of Municipal Research, Philadelphia, offers the following discussion of the city's financial situation in its January 4th number:

"The air is already full of suggestions for improvements to be undertaken as soon as peace releases labor and materials. Among them are the rehabilitation of the city's waterworks, completion of the sewage-disposal system. Various improvements to roads and transits, expansion of the city's recreational system, and better street lighting. Even this incomplete list of suggested projects bids fair to rival in cost the vast array of expensive improvements undertaken by the city after the first World War.

"Do we want to use the same method of financing improvements after this war that we used after the last? As pointed out in Citizens' Business on August 31, 1943, about 95 per cent of the city's expenditures for acquisitions and replacements of property during the period 1920–1942 were financed through long-term bond issues. Do we want to rely again to that extent upon borrowing? If we do, we may have to defer for a long time many of the improvements now being discussed. Philadelphia entered

(*Continued on page 20*)

**LAMOTTE CHROMATE COMPARATOR**



This outfit was developed for use in controlling the application of sodium chromate in refrigerating, air conditioning and cooling systems. Range of sodium chromate concentrations covered by standards 0.015 to 0.055%. Higher concentrations may be measured by diluting the sample. Price, complete $7.00 F.O.B. Towson.

**LaMotte Chemical Products Co.**
**Dept. AWA Towson-4, Baltimore, Md.**

1919 25TH ANNIVERSARY 1944

**M H**

**HIGH QUALITY VALVES HYDRANTS**

**M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.**

# PROVED

## AT A GREAT ARMY PROVING GROUNDS

### K&M *"Century"* Asbestos-Cement Pipe

It takes times like these to prove how good a product *can* be. For instance, the K&M "Century" Asbestos-Cement Pipe used for water supply purposes at a famous proving grounds in the East.

Easy *handling*, ready *adaptability*, quick *installation*—these advantages recommended time- and labor-saving "Century" Pipe. And, obviously, here were conditions where "Century" sturdiness and resistance to vibration were equally valuable assets.

For that next job of *yours*, consider those outstanding advantages of K&M "Century" Asbestos-Cement Pipe. And consider, too, that "Century" is not affected by corrosion, tuberculation or electrolysis . . . its flexible, leak-proof joints permit long radius curves without special fittings . . . its lastingly smooth bore reduces pumping costs.

Remember, we can supply "Century" Pipe *now*, if your problem is one involving government-approved municipal needs.

Our wartime activities have inspired research and stimulated progress at K&M—finding new and varied uses for Nature's strangest mineral, for the peacetime benefit of all.

* * *

*Nature made asbestos;*
*Keasbey & Mattison, America's asbestos pioneer,*
*has made it serve mankind . . . since 1873*

KEASBEY & MATTISON
COMPANY, AMBLER, PENNSYLVANIA

ARMY E NAVY
K&M
best in asbestos

* Our Ambler plants proudly fly the Army-Navy "E" flag—an honor awarded K&M employees "for outstanding production of war materials."

(*Continued from page 18*)

the last postwar period with a general borrowing capacity, including authorized but unissued bonds, of $122,400,000. Philadelphia has today no general borrowing capacity at all, other than several million dollars of authorized but unissued bonds. After the last war, the assessed valuation of taxable property rose rapidly, and, with it, the city's general debt limit. Whether a similar rise will occur after this war is uncertain.

"But do we want to continue this method even if we could thereby acquire all needed improvements with reasonable promptness? When Philadelphia increased its net bonded debt from $140,000,000 in 1921 to $418,000,000 in 1931, it also increased its annual debt service (payments of interest, sinking-fund instalments, and state tax on city bonds) from $13,900,000 to $32,000,000. That huge debt has been a millstone about the city's neck. While it has been materially reduced in recent years, it still is a heavy burden to carry, the appropriation for debt service for 1944 being $26,887,000 or 31.6 per cent of the estimated revenues for the year. Do we want to repeat the experience of the 1920's, adding to the weight of the millstone and perhaps making it heavier than ever?

"If we want needed improvements with reasonable promptness and want to decrease rather than increase the burden of debt, we must change

(*Continued on page 38*)


# SAVE FOR VICTORY

**EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.**

***Now is the time to do your part—SAVE FOR VICTORY***

## National Water Main Cleaning Co.

**30 Church St., New York, N. Y.**

**BRANCHES**

**115 Peterboro St., Boston, Mass.**
**910 William Oliver Bldg., Atlanta, Ga.**
**7103 Dale Ave., St. Louis, Mo.**
**576 Wall St., Winnipeg, Man., Canada**
**3812 Castellar St., Omaha, Neb.**
**205 West Wacker Drive, Chicago, Ill.**
**501 Howard St., San Francisco, Calif.**
**2028 Union Ave., Montreal, Canada**
**P. O. Box 683, Jacksonville, Fla.**

# HYDRO-TITE

## AND DRY BRAIDED FIBREX

**A DEPENDABLE SELF-CAULKING JOINT COMPOUND FOR CAST IRON BELL AND SPIGOT WATER MAINS**

**HYDRO-TITE** is a self-caulking sulphur base jointing compound used to joint bell and spigot cast iron water mains and soil pipe. It comes in powder form which insures uniformity and quick melting.

When poured into a joint, HYDRO-TITE immediately solidifies upon contact with the metal and bonds to both the surfaces of the bell and the spigot for the entire depth of the joint. It requires no caulking and after pouring a joint, water pressure may be immediately applied.

**HYDRO-TITE** is easy to use, no skill being required to make joints that are tight from the start. Joints made with HYDRO-TITE will stand any pressure the pipe will stand.

**DRY BRAIDED FIBREX**

### USED LIKE BRAIDED JUTE WILL NOT BREED BACTERIA

**A SANITARY** Packing used in jointing bell and spigot pipe for water, sewer mains and soil pipe.

**FIBREX** was designed for use with Hydro-Tite and other self-caulking compounds, but is entirely suitable also for joints made with lead, and for Sani-Tite and other asphalt sewer joint compounds. Thousands of pounds of Fibrex are already in service on water lines throughout the country.

## HYDRAULIC DEVELOPMENT CORPORATION

**Main Sales Office: 50 CHURCH STREET, NEW YORK, N. Y.**

**Works: WEST MEDFORD STATION, BOSTON, MASS.**

(*Continued from page 20*)

fundamentally our method of financing capital outlays: We must abandon the time-dishonored policy of relying almost entirely on borrowings and must use current revenues to a far greater extent than we have in the past. The transition to the new policy will have to be gradual, *but its inauguration should not be deferred to some more convenient time in the future.* Such a time never comes."

**Blueprinting for a 6-year public works program** is now going on at Milwaukee, "Municipal Finance News Letter" reports in its January 1st number. And the program is to be paid for partly out of money previously appropriated for debt service. In order to release the earmarked money, the city is creating a fund sufficient to retire its outstanding debts. If federal or state assistance is offered the construction program will be expanded, but the present plans are for projects which can be taken care of without borrowing or obtaining federal or state assistance.

**The Sanitary Engineering Branch,** Surgeon General's Office, was advanced to the status of a Division on January 15. It has been headed since its formation by Col. W. A. Hardenbergh.

(*Continued on page 40*)

"..and that's the toughest sweetest story ever told"

• We refer, of course, to the story of the Power Hammer Test in which a bell and spigot joint made with *Tegul*-MINERALEAD successfully withstood FIFTEEN HOURS of pounding—90,000 smashing impacts • Throughout this extraordinary test, 90 lbs. water pressure was maintained in the line—and *not a leak developed* • If you lay water main and use bell and spigot pipe, you'll want to read this story. We have it in printed form, all ready to mail when your request comes in • Don't you want to send it *right now?*

Tegul' MINERALEAD

*The* ATLAS MINERAL PRODUCTS CO. *of Pa.*
Mertztown · Pennsylvania
with representatives all over the U.S.A., including Hawaii; also Canada, at Toronto.

AT WAR'S END

replace substitute pipe with time-tested Mono-Cast Centrifugal Pipe. Manufactured according to the recently adopted ASA Law of Design or other specifications.

AMERICAN CAST IRON PIPE COMPANY

BIRMINGHAM, ALABAMA

*Sales Offices in Principal Cities*

# IMPORTANT

## Public Health must be maintained!

The necessity of maintaining public health in war time is self-evident. Municipal officers in charge of water purification and sewage disposal have a vital responsibility in guarding the nation's health, that should not be underestimated as a contributing factor to final victory.

However, the problems of maintaining public health are *becoming increasingly difficult in the face of material shortages and transportation handicaps.* In order to ease this situation in regard to *Aluminum Sulfate* as much as possible, won't you place your orders as far ahead as you can so that we may schedule our production on an efficient basis.

### Why Most American Cities Prefer General Chemical Aluminum Sulfate

General Chemical Aluminum Sulfate is an especially developed "Alum." High quality and constant uniformity have given it *a time-tested* reputation among water works engineers and sewage plant operators.

★ **FOR WATER WORKS**

1. Makes water crystal clear.
2. Longer filter runs are obtainable.
3. Is economical, used properly will conserve chlorine supplies . . . because it does not require oxidation to make it effective.
4. Superior in tests against other coagulants.
5. High in quality, its constant uniformity can be counted upon.

★ **FOR SEWAGE PLANTS**

1. Clean, easy to handle and economical to use.
2. Simple application, requires only low cost feeding apparatus and minimum attention.
3. Clear, colorless effluents are possible.
4. Precipitated sludge digests readily.
5. Treated digested sludge dries quickly, without odor.

**GENERAL CHEMICAL COMPANY**

**40 RECTOR STREET, NEW YORK 6, N. Y.**

*Technical Service Offices:* Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh Providence (R. I.) • St. Louis • Utica (N. Y.)

*Pacific Coast Technical Service Offices:*
Los Angeles • San Francisco • Seattle, Wenatchee and Yakima (Wash.)

*In Canada:* The Nichols Chemical Co., Ltd. • Montreal • Toronto • Vancouver

(*Continued from page 38*)

**Twenty-three hundred public works employees** of Philadelphia were on strike for 17 days in January. Street-cleaning operations suffered most, but the water works was also noticeably crippled. The demand of the strikers was for a 10 cents an hour wage increase. Five cents was finally accepted. *Citizen's Business,* published weekly by the Bureau of Municipal Research in Philadelphia, reported on January 18, "Since 1940, the pay of the per diem employees in the Department of Public Works has increased considerably more than has the cost of living." On January 25, it added, "In 1943, Philadelphia's wage rates for street-cleaning laborers appear to have been low as compared with those of most of the large American cities."

During the strike, skeleton crews operated the water stations and plants. In the case that a house was completely without water, repairs were made, but five mains on the high pressure fire system were not repaired. Three mains out of a total of 64 leaking mains and 17 fire hydrants reported were fixed. The Water Department's River Patrol did not operate, but water samples from the distribution system were collected by trucks under guard.

(*Continued on page 42*)

KUPFERLE FIRE HYDRANTS

**Meet All Conditions**

Types and sizes for all public and private installations. Proven working efficiency under all conditions. "Kupferle" has been the standard for fire hydrants for more years than you can remember.

**JOHN C. KUPFERLE FOUNDRY CO.**
ST. LOUIS

EDSON
DIAPHRAGM PUMPS

*Hand Operated--sizes 2", 2½", 3", 4"*
*Power Operated--sizes 3" and 4"*

*Open Discharge or Force Pump*
*Skid, Truck or Trailer Mounted*

COMPLETE PUMP OUTFITS
*Edson Pumps - Suction Hose*
*Brass Couplings - Bronze Clamps*
*Red Seal Diaphragms*
*Brass Strainer or Foot Valve*
*Hose Spanners - Adapters - Etc.*

*Also*—Brass Hydrant Pumps

THE EDSON CORPORATION
Main Office and Works: 49 D St., South Boston, Mass.
New York, 142 Ashland Pl., Brooklyn

# CAST IRON PIPE

*Manufactured in Sizes 2" to 96"—*
*A large stock constantly on hand,*
*facilitating prompt shipment.*

**Flanged Pipe**

**Special Castings**

**Flexible Joint Pipe**

**Bell and Spigot Pipe**

**Warren Spun Centrifugally Cast Iron Pipe**

**Short Body B. & S. Specials**

**Warren Foundry & Pipe Corp.**

*and*

**Warren Pipe Co. of Massachusetts, Inc.**

*Sales Offices*
11 BROADWAY, NEW YORK, N. Y.
75 FEDERAL ST., BOSTON, MASS.

*Works*
PHILLIPSBURG, N. J.
EVERETT, MASS.

(*Continued from page 40*)

**Lowest since 1932** is the present total indebtedness of American cities of over 25,000, says the U.S. Bureau of the Census, as reported by "Public Management" in December. The total sum is slightly more than $8,000,000,000. Net long-term debts for 1943 were 4.2 per cent lower than they were in 1942 and short-term debts were down 6 per cent from the previous year. Fifty-four per cent of the total debt for the 410 cities on the list was accounted for by the 5 cities of the country having over a million people. There were 20 cities with debts of over $50,000,000 a piece. These made up 71 per cent of the total.

**Fires having a significant effect upon the war effort** during 1943 are summarized in a 24-page pamphlet just issued by the National Fire Protection Assn. It is available from the NFPA at 60 Batterymarch St., Boston 10, for 25¢.

The NFPA is offering a pre-publication copy of its *National Fire Codes for Building Construction and Equipment* to each of its members at $1.00, and additional pre-publication orders are $2.00 each. This new 560-page book, incorporating some 40 separate NFPA Standards, will be published on March 1, and on that date and thereafter will be $3.00 per copy.

(*Continued on page 44*)

NO MORE RUST

Will Form Inside Your Steel Tanks If You Use

"RUSTOP"

**STOPS CORROSION**—Immediately, Permanently, and **ECONOMICALLY.** No Sandblasting, Scraping or Painting. Many Types of Special Applications.

*Write immediately for complete data and quotations—No obligation.*

THE APPROVED METHOD

RUSTOP
THE CATHODIC SYSTEM OF CORROSION PREVENTION

ELECTRO RUST-PROOFING CORP.
DAYTON • OHIO

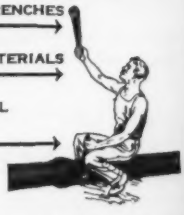
3 *Money, Time and Labor Saving Features of*

UNIVERSAL CAST IRON PIPE

LAID WITH ONLY WRENCHES

NO CAULKING MATERIALS

NO GASKETS. NO BELL HOLES TO DIG.



**For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.**

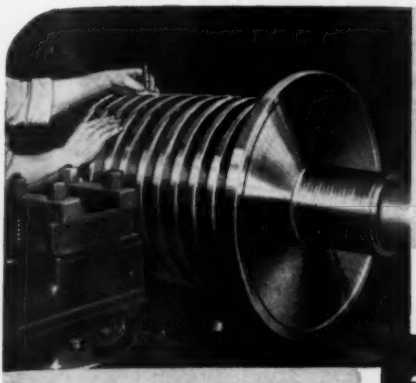
*Dept. C*
**THE CENTRAL FOUNDRY COMPANY**
**386 FOURTH AVENUE, NEW YORK 16, N. Y.**

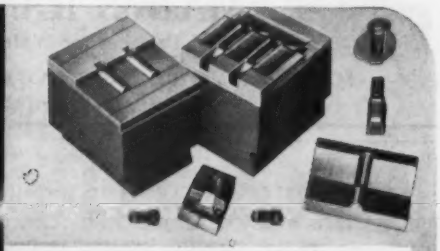
**Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.**

**NAME**_____

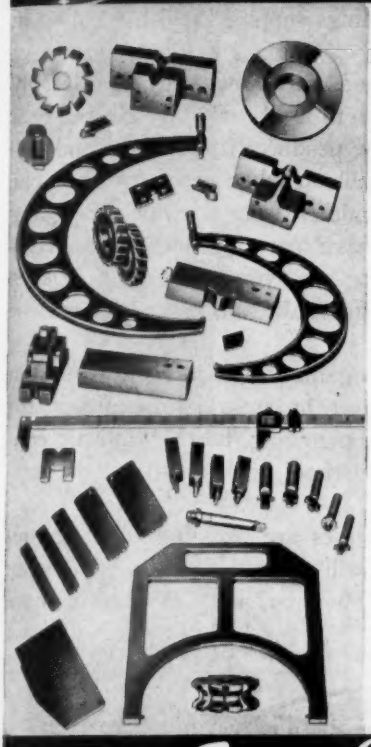
**STREET**_____

**CITY**_____





Special tools, gages, jigs and templates used in the production of the integral steam turbine rotor shown.



A Manufacturing Policy
THAT HAS STOOD THE
TEST OF TIME

From its inception in 1901, the De Laval Steam Turbine Company has recognized that the best results are obtainable only by confining the work of its staff to the development, design and production of a single class of manufacture, having the same general characteristics and requiring the same processes and high grade of workmanship. Consequently the efforts of the company have been confined to high-speed rotary power equipment, including STEAM TURBINES, HELICAL and WORM SPEED REDUCING GEARS, CENTRIFUGAL PUMPS and COMPRESSORS and ROTARY OIL PUMPS.

The jigs, tools and gages required for the production of high-grade work are much more expensive and elaborate than are those necessary for work requiring less refinement and care in manufacture. Also, the type of shop employee who can perform this accurate work is entirely different from that required for less particular and accurate classes of work.

M-29

De Laval STEAM TURBINE CO.
TRENTON 2, N.J.

Manufacturers of TURBINES - STEAM, HYDRAULIC PUMPS - CENTRIFUGAL, GLOBLESS ROTARY DISPLACEMENT, MOTOR-MOUNTED, MIXED-FLOW, PROPELLER, PRIMING SYSTEMS, CENTRIFUGAL BLOWERS and COMPRESSORS, GEARS - WORM, HELICAL and FLEXIBLE COUPLINGS

*PREVENT WEAR AND CUTTING of rods, plungers and shafts by using*

MABBS

**MABBS RAWHIDE PACKING**

**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**

(*Continued from page 42*)

**Postwar reconversion** is going to produce some patterns which will look as crazy as Donald Duck, according to Donald M. Hobart of the Research Dept. of the Curtis Publishing Co. Airplane companies will make cameras, farm implements, household appliances, optical equipment, and building materials, while airplanes and diesel engines for airpower will be made by machinery and equipment companies. Tire manufacturers will turn out light metal items and housefurnishings suppliers will be dealing in boats and prefabricated houses.

Hobart's survey, covering 350 companies in 22 major groups, largely durable goods industries, shows some reason to it all. Forty-eight per cent of the companies are producing largely new products for the war and will face major reconversion and marketing problems when peace comes. The remaining companies, making peacetime products, some of which are going to war and some to home consumers, will have minor production reconversion problems but will face major marketing reconversion in order to keep in step and compete with the strenuous efforts the war industries will be making.

Postwar planning now is a definite, organized activity in 60 per cent of the companies questioned. The greatest progress in organizing for peace has been made by manufacturers of plumbing, heating and air conditioning, airplanes, building materials, household appliances, and the miscellaneous group.

Fifty-eight per cent of all the companies are planning to bring out some new product. Thirty-two per cent will enter new fields. Fifty-six per cent said they can reconvert within 3 months, and 14 per cent more said they could do it in 6.

(*Continued on page 46*)

ZECO GREENSAND ZEOLITE

ZECO and HI–ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

**ZEOLITE CHEMICAL CO.**

**90 WEST STREET** **NEW YORK 62, N. Y.**

# The Labor-Saving FIRE HYDRANT

## . . . in Maintenance
## . . . in Operation
## . . . in Repair

MANPOWER . . . a prime war-time shortage . . . is conserved by SAFETOP. Its maintenance requires only a few minutes once or twice a year for inspection. Its simple, long-lasting mechanism practically never requires adjustment. If broken by a colliding vehicle, the repair is a one-man job, requiring less than half an hour. And it conserves the firemen's time, too, because of its immediate response and ease of operation. Send for bulletin describing this LABOR-SAVING fire hydrant in detail.

**THE KENNEDY VALVE MFG. CO. • ELMIRA, N. Y.**

# KENNEDY
## SAFETOP FIRE HYDRANT
REG. U.S. PAT. OFF.

(*Continued from page 44*)

**Builders Iron Foundry,** Providence, R.I., one of the oldest water works equipment manufacturers in the country, has just adopted a youngster more than 100 years its junior. Recently the Omega Machine Co. of Kansas City, Mo., which was started in 1928, became a wholly owned subsidiary of Builders, which began its life in 1820. L. E. Harper, founder and Pres. of Omega, will remain at the helm in Kansas City.

Omega makes volumetric and gravimetric dry feeders and continuous lime slakers. During the past few years, Omega has handled an expanding volume of orders for war plant facilities, necessitating the purchase of new and larger quarters in 1942. Still larger manufacturing facilities will now be available to them.

Since 1889, Builders has been manufacturer of the Venturi Meter. Its extensive line of flow meters, controllers, gages, etc., is now distributed by Builders-Providence, Inc., a division of Builders Iron Foundry.

Builders has engaged in the manufacture of special war products during World War II, the fourth major conflict in which the company has served the armed forces in this manner. Its third Army-Navy "E" during this war has just been awarded to Builders.

(*Continued on page 48*)

**SAFE!—**
**Water Purification**

• Operated under vacuum . . . accidental break in gas line or water failure draws air *in*, actuating automatic shut-off.

• One valve control . . . tremendous capacity range . . . precision metering with a *visible* indicating meter, the most accurate and dependable gas-flow meter yet developed, accurate to a plus or minus ½%!

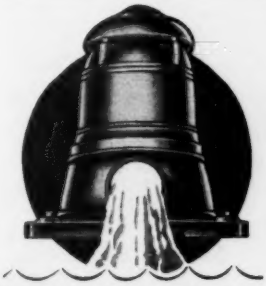
SterElators by Everson

*Write for Bulletin*

**EVERSON MFG. CO.**
221 W. HURON ST. CHICAGO 10, ILL.

Meter Boxes
Meter Testers
Meter Yokes & Couplings
Valve Boxes
Service Boxes
Manhole Covers
Street Castings
Special Castings

**H. W. CLARK COMPANY**
Mattoon, Illinois, U. S. A.



# BUILT TO LAST

## *For the Duration and Many Years Longer*

Never in the history of municipal operation has the rugged quality of Layne Well Water Systems been more sincerely appreciated. These systems, even under extreme overload and long periods of continuous operation, keep right on producing millions and millions of gallons of water daily.

In the first place, your Layne Wells and Pumps were designed right. Second, they were built of the finest quality materials. Such foresight and high skill now pay great dividends.

You may not be able to obtain the new Layne Wells and Pumps you now need, but the moment war is over, Layne will again swing back to municipal installations. In the meantime service is being provided for essential repairs on existing installations. If you wish late literature

*Write*

**LAYNE & BOWLER, INC.**
MEMPHIS, TENN.

**LAYNE WELLS & PUMPS**

## HAVE YOU A COPY OF THIS BOOK BY Dr. HALE?†

••• AN AUTHORITATIVE WORK CONCERNING THE CONTROL OF MICRO-ORGANISMS AND ELIMINATION OF TASTES AND ODORS

This revised and enlarged edition, written by Dr. Frank E. Hale, describes in complete detail methods of control of the various forms of microscopic life commonly dealt with in water supply systems. Descriptive material includes 48 beautifully clear photomicrograph studies of the organisms discussed. Simplified methods of applying copper sulphate are also well diagramed and fully illustrated by photographs.

Thousands of copies of this 44 page book have already been distributed throughout the world. *Plant engineers and others concerned with this subject should not be without* "THE USE OF COPPER SULPHATE IN CONTROL OF MICROSCOPIC ORGANISMS." Write for it today on your business letterhead.*

* Unfortunately, because of the cost of preparation of this book, it is necessary to limit its distribution to those who are professionally occupied with this subject.
† Director of Laboratories, Dept. of Water Supply, Gas and Electricity, N. Y. C.

**NICHOLS COPPER SULPHATE** TRIANGLE BRAND
99⅔% + PURE

*Made by*
**PHELPS DODGE REFINING CORPORATION**
*Electrolytic Refiners of Copper*
Offices: 40 Wall Street, New York, N. Y.
230 North Michigan Avenue, Chicago, Ill.

(*Continued from page 46*)

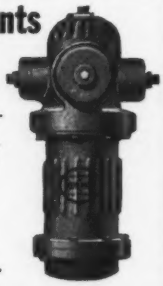
**"War Department engineers** recently returned from the European war zone are praising the new portable pipelines," says a recent release. "These jointed pipelines carry liquid supplies—sometimes water, more often gasoline—from rear depots to battlefront supply areas. They are scrap steel eaters too, according to these War Department engineers.

"These unique, military pipelines were inspired by the famed 'Big Inch' pipeline that helped alleviate a serious petroleum shortage in the eastern United States. Statistics about these military lines are imposing. Just one mile of its twenty foot section lengths weighs almost eleven tons —half of this steel, five and a half tons, are made of scrap iron and steel. The pipe eats up $3,000 worth of War Bonds for each mile. According to the War Department, these pipelines have been laid with astonishing speed in lengths of from 75 to 100 miles over every kind of terrain.

"These easy-to-carry flexible steel pipelines solve the knotty problem of how to transport weighty bulk liquids as diverse as water and petroleum over long distances. These military pipelines solved the problem, too, of exposure to enemy air attack where trucks and similar vehicles had been used. They are now used to supply the heavy requirements of oil and gasoline for our many shifting battlefronts."

**Vogt Fire Hydrants**

Standard—
"Traffic Model"—
Flush Type—
Water Crane—
Type



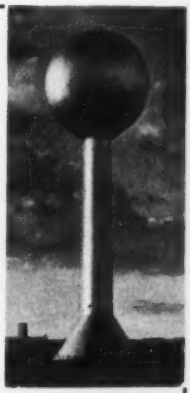
**Vogt Gate Valves**

Non-Rising Stem—Outside Screw and Yoke—Hub End —Flanged End—Ends to Fit any Type Pipe.

Also—Floor Stands, Shear Gates—Tapping Sleeves and Valves, Flap Valves and Mud Valves.

**Vogt Brothers Mfg. Co.**
INCORPORATED
MAIN AT 14th ST.
LOUISVILLE KENTUCKY

**Prevent Rusting**



Rusta Restor cathodic protection, provides *permanent protection* against rusting of water tanks, piping and steel structures of all kinds.

Initial cost of a complete equipment is about equal to the cost of a good paint job. . . . Operation costs only about 2 mills (i. e. $0.002) per year per square foot of surface protected.

If your tanks and steel structures are not now protected by this proven low-cost method, they should be. No obligation. Send for fully descriptive literature today.

**RUSTA RESTOR**
Division of
THE JOHNSTON & JENNINGS CO.
862 Addison Road Cleveland, Ohio

# NEWS OF THE FIELD

**The American Water Works Association** for many years has maintained the policy of exempting from further payment of dues any active members who has belonged to the organization for 30 years. While no special designation has ever been officially given to these members, the Association staff always thinks of them as *senior* members.

The two oldest members of the Association, in terms of years of membership, are William F. Wilcox of Atlanta, Ga., and Emiel A. Croll of Orlando, Fla. Wilcox is still actively at work as a manufacturer's representative in Atlanta. Croll retired several years ago. They both joined the Association in September 1893—over 50 years ago.

Senior members of the Association, in addition to Wilcox and Croll, are:

**1894**

H. L. Williams,
Pentwater, Mich.

**1900**

F. J. Connor,
Sioux Falls, S.D.

**1902**

Harold T. Havill,
Valhalla, N.Y.

**1903**

Charles M. Horner,
East St. Louis, Ill.

T. A. Mellon,
Pittsburgh, Pa.

**1904**

Eugene Carroll,
Butte, Mont.

**1906**

Irving C. Bull,
Middletown, N.Y.

John H. Cook,
Paterson, N.J.

E. V. French,
Boston, Mass.

T. B. Hunter,
San Francisco, Calif.

Elbert E. Lochridge,
Springfield, Mass.

Clyde Potts,
New York, N.Y.

Sheppard T. Powell,
Baltimore, Md.

Samuel Palmer Senior,
Bridgeport, Conn.

Walter A. Shaw,
Chicago, Ill.

L. Van Gilder,
Atlantic City, N.J.

Elton D. Walker,
State College, Pa.

**1907**

George R. Ellis,
Canandaigua, N.Y.

Harry Ellsworth,
Meadville, Pa.

Samuel A. Greeley,
Chicago, Ill.

Theodore Horton,
Cape Cod, Mass.

F. F. Longley,
Ampere, N.J.

Fred B. Nelson,
New York, N.Y.

Ermon M. Peck,
Hartford, Conn.

**1908**

Charles A. Emerson,
New York, N.Y.

F. N. Isaac,
Hanford, Calif.

Andrew J. Provost, Jr.,
Noroton, Conn.

George R. Taylor,
Scranton, Pa.

**1909**

Carroll P. Bassett,
Summit, N.J.

George B. Bassett,
Buffalo, N.Y.

Warren U. C. Baton,
Pittsburgh, Pa.

William H. Boardman,
Philadelphia, Pa.

Howard M. Ely,
Danville, Ill.

Anthony Keils,
Mt. Clemens, Mich.

Elmer G. Manahan,
Mt. Vernon, N.Y.

Cornelius C. Vermeule,
East Orange, N.J.

(*Continued on page 2*)

(*Continued from page 1*)

**1910**

James W. Armstrong,
Bradenton, Fla.

Charles F. Attersall,
Winchester, Ky.

J. N. Chester,
Pittsburgh, Pa.

Charles Elmer Clifton,
Troy, N.Y.

Magnus F. Corin,
Philadelphia, Pa.

Wellington Donaldson,
New York, N.Y.

William T. Field,
Watertown, N.Y.

Edward A. Fowler,
New Orleans, La.

J. Arthur Jensen,
Minneapolis, Minn.

A. G. Levy,
Cleveland, Ohio

Alexander C. Powell,
Bangor, Me.

Ezra B. Whitman,
Baltimore, Md.

**1911**

Horace A. Brown,
Ottumwa, Iowa

Philip Burgess,
Columbus, Ohio

C. C. Gillespie,
Berkeley, Calif.

Robert E. Horton,
Voorheesville, N.Y.

Richard Messer,
Richmond, Va.

A. R. Murphy,
Fountain City, Tenn.

R. J. Smith,
Perth, Ont., Canada

E. C. Trax,
McKeesport, Pa.

**1912**

Moro M. Borden,
Collingswood, N.J.

John N. Brooks,
Trenton, N.J.

Charles L. Fox,
Wilkinsburg, Pa.

Charles H. Lee,
San Francisco, Calif.

Wm. J. McGonigale,
Louisville, Ky.

Edward Eastman Minor,
New Haven, Conn.

C. P. Rhynus,
Poughkeepsie, N.Y.

(*Continued on page 4*)


# TELL US NOW

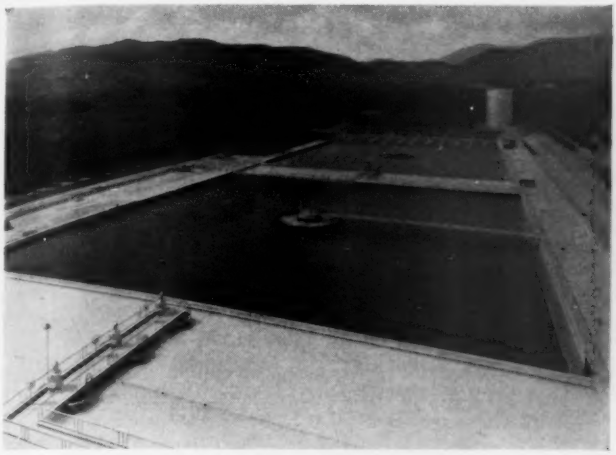
## *We'll Be Ready With* ENOUGH *and* ON TIME!

NOW is the time for a seasonal check-up of your water works requirements. Although a large part of our facilities are being used to produce specialized items for the Army, Navy, and Air Corps, we are manufacturing a full line of Water Works Products, subject of course, to W.P.B. approval.

We suggest that you be conservative in your estimates, but get your orders in as quickly as possible. We will be ready with enough and on time.

**HAYS MANUFACTURING COMPANY, ERIE, PENNA.**

**WATER WORKS PRODUCTS**



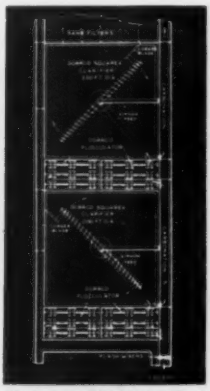


Diagram Showing Flash Mixing of Chemicals Followed by Flocculation & Sedimentation

## ● MODERN WATER TREATMENT PLANTS IN WHICH DORR FLOCCULATORS & CLARIFIERS ARE INSTALLED FOR TURBIDITY, COLOR & HARDNESS REMOVAL

Chicago
Cincinnati
Metropolitan Water District So. Calif.
St. Louis
St. Paul
Kansas City
Louisville
Denver
Milwaukee
Miami
Richmond, Va.
Des Moines, Ia.
Covington, Ky.

● In your plans for post-war modernization and new construction, remember that the Dorr Equipment in these plants was selected on a value received basis and has given unfailing service under war time maintenance conditions.

● No matter what the size of the plant—large or small, Dorr Flocculators and Clarifiers, square or round, make an ideal combination for low cost of construction and efficient operation. They can be arranged to fit existing construction or to form the heart of a new plant. They are adaptable to all types of raw water—hard or soft, turbid or clear, or any combination of these characteristics.

● With automatic continuous operation, duplicate units furnish all the flexibility required in large plants.

DORRCO

THE DORR COMPANY • ENGINEERS

570 LEXINGTON AVE., NEW YORK

*Atlanta* *Toronto* *Chicago* *Denver* *Los Angeles*

(*Continued from page 2*)

E. G. Ritchie,
Melbourne, Australia

F. H. Stover,
Fort Douglas, Utah

George A. Taber,
Reading, Mass.

G. H. Abbott,
Southbridge, Mass.

**1913**

Robert E. Andrews,
San Francisco, Calif.

George L. Bean,
Philadelphia, Pa.

Lewis I. Birdsall,
Glencoe, Ill.

Ernest B. Black,
Kansas City, Mo.

H. P. Bohmann,
Milwaukee, Wis.

Juan A. Cosculluela,
Havana, Cuba

John M. Diven,
Jackson Height, L.I., N.Y.

Scotland G. Highland,
Clarksburg, W. Va.

William Christian Hoad,
Ann Arbor, Mich.

Thomas Hodkinson,
London, Ont., Canada

Charles P. Hoover,
Columbus, Ohio

William I. Klein,
East Orange, N.J.

John Knickerbacker,
Troy, N.Y.

C. R. Knowles,
Chicago, Ill.

Hubert P. T. Matte,
Harrison, N.J.

Robert E. McDonnell,
Kansas City, Mo.

Langdon Pearse,
Chicago, Ill.

John W. Pray,
Ft. Dodge, Iowa

Charles M. Roos,
East St. Louis, Ill.

Morrell Vrooman,
Gloversville, N.Y.

H. A. Whittaker,
Minneapolis, Minn.

**1914**

A. Clinton Decker,
Birmingham, Ala.

Robert C. Dennett,
New York, N.Y.

William R. Edwards,
Rochester, N.Y.

(*Continued on page 6*)

DIFCO

# *Detection of Coli in Water*

This group of Difco Dehydrated Culture Media is recommended for the detection and confirmation of the presence of coliform bacteria in water. Each medium is prepared to conform to all requirements of "Standard Methods of Water Analysis" of the A. P. H. A. and A. W. W. A.

**Bacto-Lactose Broth**
**Bacto-Endo Agar**
**Levine's Eosin Methylene Blue Agar, Difco**
**Bacto-Brilliant Green Bile 2%**
**Bacto-Crystal Violet Lactose Broth**
**Bacto-Formate Ricinoleate Broth**
**Bacto-Fuchsin Lactose Broth**

**Specify "DIFCO"**

**DIFCO LABORATORIES**
INCORPORATED
**DETROIT, MICHIGAN, U. S. A.**

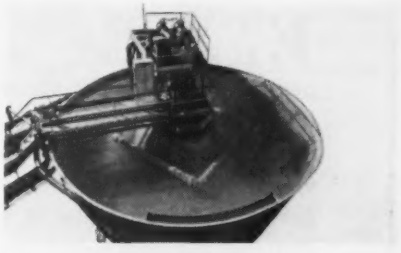
# ALL OVER TOWN...

## your citizens will welcome soft, clear water!

WATER is easily the most important of the public utilities—more vital than gas or electricity. What *kind* of water is going into the homes, shops and factories in your city? Is it soft and sparkling, free of dirt and iron? It *can* be! Hundreds of up-and-coming communities enjoy good water—supplied by Permutit* equipment.

Get ready for this postwar improvement *now*. Just drop a line to The Permutit Company, Dept. G2, 330 West 42nd St., New York 18, N. Y. In Canada: Permutit Company of Canada, Ltd., Montreal.

* Trademark Reg. U. S. Pat. Off.



**Permutit Spaulding Precipitator removes hardness, dirt and color from municipal water supplies. This new-type equipment for cold lime soda softening takes only half the space of older methods, cuts detention time, saves chemicals. Installations now handle capacities up to 120,000,000 gallons daily.**

# PERMUTIT

WATER CONDITIONING HEADQUARTERS

COOK Well Strainers

A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.
Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 4*)

L. A. Fisher,
Concord, N.C.

Weston Gavett,
Plainfield, N.J.

August V. Graf,
Chesterfield, Mo.

Charles A. Haskins,
Kansas City, Mo.

E. Robert Howland,
London, S.W.1, England

W. T. McClenahan,
Chicago, Ill.

Ambros Mundy,
Woodridge, N.J.

J. B. Nevling,
Clearfield, Pa.

James A. Newlands,
Hartford, Conn.

Walter P. Schwabe,
Thompsonville, Conn.

Walter Moffat Scott,
Winnipeg, Man., Canada

Walter A. Sperry,
Aurora, Ill.

Harrington P. Stearns,
Lynbrook, L.I., N.Y.

Russell Suter,
Albany, N.Y.

Seth M. Van Loan,
Philadelphia, Pa.

Vernon F. West,
Portland, Me.

Robert C. Wheeler,
Albany, N.Y.

(*Continued on page 8*)

SAVE FOR VICTORY

EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.

*Now is the time to do your part—SAVE FOR VICTORY*

National Water Main Cleaning Co.
30 Church St., New York, N. Y.

BRANCHES

115 Peterboro St., Boston, Mass.
910 William Oliver Bldg., Atlanta, Ga.
7103 Dale Ave., St. Louis, Mo.
576 Wall St., Winnipeg, Man., Canada
3812 Castellar St., Omaha, Neb.
205 West Wacker Drive, Chicago, Ill.
501 Howard St., San Francisco, Calif.
2028 Union Ave., Montreal, Canada
P. O. Box 683, Jacksonville, Fla.

# The Latest Development in a Mechanical Joint for Cast-Iron Pipe

## The "All-in-One" DRESSER Bellmaster Joint

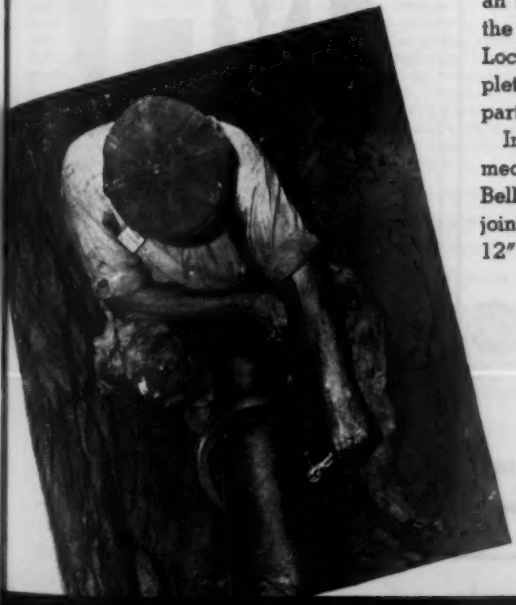
**As** cast-iron pipe again becomes available, you naturally take keen interest in a faster and better method of joining it. The compact, tight, flexible Dresser Bellmaster Joint, Style 85, offers you both speed and efficiency.

In the Bellmaster, Dresser engineers have developed a mechanical joint of amazing simplicity. Each joint consists of a resilient rubber-compound gasket compressed by capscrews between two light, strong malleable iron rings. It is shipped, stocked and installed completely assembled.

The Dresser Bellmaster makes up tight and stays tight. Automatically absorbing expansion, contraction, deflection and vibration to an unusual degree, it cushions and protects the pipe while maintaining a constant seal. Locked within the bell of the pipe, it is completely enclosed. No cutside lugs, no exposed parts to chip or corrode.

Investigate this latest development in a mechanical joint for C I P. Makers can supply Bellmaster pipe, and we are able to ship joints promptly. Sizes—3″, 4″, 6″, 8″, 10″, 12″ and 16″

*Catalog 413 ARM on request.*



Your workman has only one piece to handle—even the newest man on the job can make up tight joints in from two to five minutes with the Dresser Bellmaster.

**DRESSER** MANUFACTURING COMPANY • BRADFORD, PA.

AFFILIATED WITH DRESSER INDUSTRIES

(*Continued from page 6*)

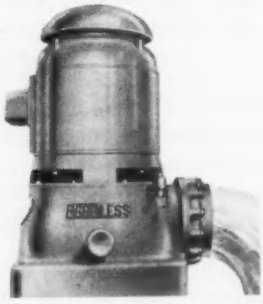
**Paul Hansen,** Cons. Engr. of Chicago, died on February 6th, at the age of 64. He was actively concerned in defense work for the War Dept. at the time of his death.

Mr. Hansen, who graduated from Mass. Inst. of Technology in 1903, was with the Massachusetts, Ohio, Kentucky, and Illinois State Boards of Health and held several public and private engineering posts before forming the partnership of Greeley & Hansen in Chicago in 1920. Since then he has been engaged in design and construction of numerous water supply and sewerage works. During the First World War he served in France with General Pershing as a staff officer on water supply.

Mr. Hansen was the organizer of the work which lead to the compilation and publication of the *Manual of Water Quality and Treatment* by the A.W.W.A. His last Association assignment was that of Chairman of the Committee on Standard Specifications for Filtering Material.

(*Continued on page 10*)

**Year after year of unsurpassed performance**



**Peerless Pumps**

**PEERLESS PUMP DIV.—Food Machy. Corp.**
**301 W. Ave. 26, Los Angeles 31, Calif.**
**1250 W. Camden Ave., S. W., Canton 6, Ohio.**
**Other Factories: San Jose 5, and Fresno 16, Calif.**

**HIGH QUALITY VALVES HYDRANTS**

**M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.**

# New Materials Better Accessories

## FOR %PROPORTIONEERS%- CHEMICAL FEEDERS

### INJECTION NOZZLE

This plastic nozzle is crystal clear and non-corrosive; flow is visible at all times. The new nozzle retains all the good features of the %Proportioneers% metal nozzle, including automatic shut off if tubing fails. Connection of compression type, for either low or high pressure hose or plastic tubing, is installed without special tools and assures a strong leakproof union.

### FOOT VALVE

This improved foot valve, of non-corrosive, transparent plastic, features a cup which may be filled with glass wool or sponge rubber for filtering. Sludge-proof – with suction opening 1½ in. from the bottom of solution tank. "See-thru" construction proves at a glance that check valve is clean and working properly. Hose or tubing connection is of positive compression type.

### DIAPHRAGM

This fabric-reinforced diaphragm of neoprene rubber is a superior product with longer life under more difficult operating conditions. Moulded in one piece, with non-chafing plastic push plate, no diaphragm clamp is necessary. The patented diaphragm is dish-shaped with curvature moulded into its surface to best withstand continuous flexing action.

All %Proportioneers% plastic parts are *moulded* giving higher mechanical strength and better appearance than machined plastic parts. Write *today* for full information on these and other improvements that will bring your present equipment up to date.

## % PROPORTIONEERS, INC. %
*Chemical Feeder Headquarters*

61 CODDING ST., PROVIDENCE 1, RHODE ISLAND

(*Continued from page 8*)

**An epitome of the effect of the war** upon operations of a water company is found in "Water Lines" (Indianapolis Water Co.) for January 28, 1944. This company, serving a recorded population of 386,972 in 1940 and an estimated wartime population in excess of 425,000, records its 1943 operation and extension activities as follows:

"Last year was a record-breaking year as far as pumpage was concerned. First, the annual total—16,558,170,000 gallons! More than two billion more than in '42. Second, the greatest month—July, with 1,655,000,000 gallons! Third, the highest day—July 27, with 60,610,000 gallons! Even the low month of February—1,140,000,000 gallons—was larger than some summer months not so many years ago.

"Our distribution system did not expand very much, due to wartime restrictions on new housing, cast iron pipe, etc., but we did lay *285 feet* of pipe to bring our distribution system mileage up to around $729\frac{3}{10}$ miles.

"Fire hydrants, too, suffered a blackout—none added. Total—6,516.

"Customers did increase, however—from 86,212 at the first of the year to 87,193 at the end, making a gain of 981, which, although not as great as in previous years, is noteworthy considering current conditions.

(*Continued on page 12*)

**Free**

**those**

**Stubborn—Clogged**

**BINS—HOPPERS—CHUTES**

*with*

SYNTRON

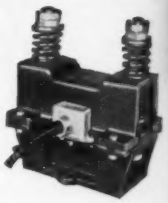
*"Pulsating Magnet"*

**ELECTRIC VIBRATORS**

**Seven Models—all with Rheostat Controlled Power.**

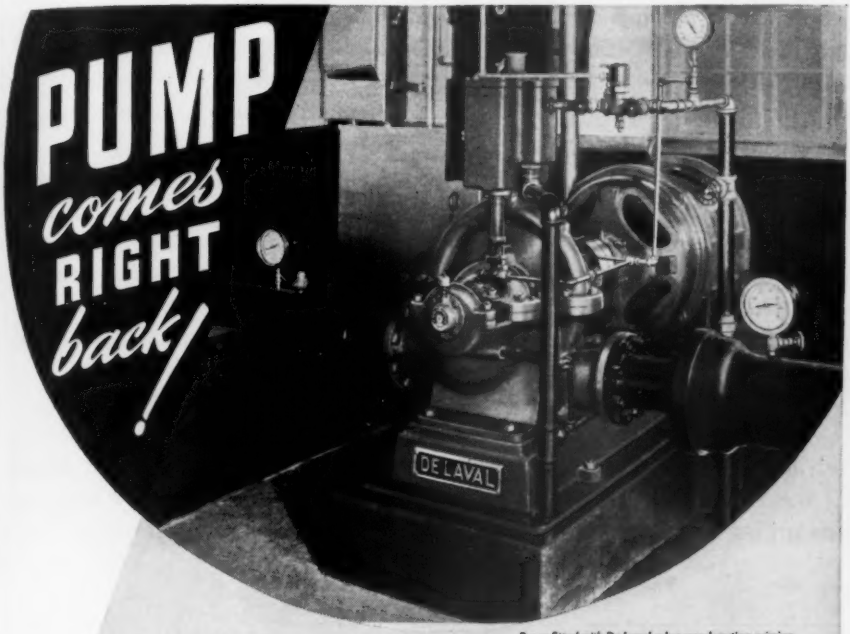
**Small "Noiseless" V-9 and V-15's for chemical feeder machine hoppers.**

**Large "Impact" V-25, V-75, V-200 and V-500's for chemical storage bins, coal hoppers, chutes, etc.**



**WRITE US ABOUT YOUR PROBLEM**

**SYNTRON CO. 428 Lexington, Homer City, Pa.**




Pump fitted with De Laval submerged suction priming system; 1100 g. p. m. against 245 ft. at 1750 r. p. m.

If the three-quarter-inch corporation cock on the suction pipe of the pump illustrated above is opened wide, delivery of water ceases, but is resumed again within one minute after the cock is closed, the pump being at once reprimed by the

**DE LAVAL *SUBMERGED SUCTION* PRIMING SYSTEM**

Were the air inleakage too great for the priming system to handle, the pump would automatically be shut down and could not be started again until the fault had been corrected.

With the De Laval Priming System the pump cannot be started unprimed.

Danger of surges or water-hammer reaching the pump casing is eliminated or minimized.

The pumping unit can be started or stopped at any time, from a remote control point if desired.

Proper adjustment of packing glands is simplified, as pressure is not admitted to the pump casing and suction line.

*Ask for Publication P-3224.*

DE LAVAL *Steam Turbine Co.*
TRENTON, N. J.
MANUFACTURERS OF TURBINES . . . STEAM, HYDRAULIC PUMPS . . . CENTRIFUGAL, PROPELLER, ROTARY DISPLACEMENT, MOTOR MOUNTED, MIXED FLOW, CLOSE-COUPLED, SELF PRIMING, CENTRIFUGAL REDUCERS and COMPRESSOR GEARS . . . WORM, HELICAL and HERRING-BONE GEARS

(*Continued from page 10*)

"A comparison of service turns-ons for the last ten years reveals that people aren't moving around as much as before. Last year, there were only 6538 turn ons. In '42, 10,111 ons; in '41, 12,352; in '40, 13,556; and so on back to 1934 when there were 18,245 turn-ons! This tendency to stay put certainly helps the war effort by conservation of our manpower, tires, gas, etc."

With a little over 1 per cent increase in active services (customers) the total pumpage increased over 14 per cent. Less than ‡ mile of new mains were laid and not a single fire hydrant added to the distribution system. Only a water system that had kept prepared for a super-demand could have carried on as this one did in 1943, *but* there may be a lot of planning going on right now to catch up with war-deferred extensions and maintenance.

**The Cast Iron Pipe Research Association** has been awarded a certificate by the Treasury "for distinguished services rendered in behalf of the War Savings Program." Cast Iron Pipe Research ran a series of ads urging the purchase of War Bonds in a number of magazines.

(*Continued on page 14*)

METER BOX COVERS

Ford Meter Box Covers are made in a variety of types and sizes for all conditions. Double-lid covers have air-space insulation and sloping skirts which cut down heat loss to a minimum. Single lid covers have overlapping or inset lids and are made in several depths and lid sizes. All Ford Covers have the Lifter Worm Lock and are made to give a lifetime of satisfaction. Write for our catalog of better equipment for water meter setting and testing.

FORD METER BOX CO.,
WABASH, IND.

IN BELL & SPIGOT WATER MAIN
Jointing Compound
You cannot beat
This Combination

1—**SULPHUR BASE**—Low initial leakage.

2—**OLEFINE POLYSULPHIDE** plasticizing agent. Imparts high resistance to mechanical shock and temperature changes.

3—**INGOT FORM**—Facilitates handling. Most convenient to ship and store.

4—**LIGHT WEIGHT**—1/5th that of lead—and this compound goes three times as far.

5—**AVAILABILITY**—stocked at convenient points over the U. S.

Also—impervious to moisture and, mixed correctly at factory, cannot change composition en route to job. Give your next water main laying job the advantages and sound economies of

Tegul' MINERALEAD

THE ATLAS MINERAL PRODUCTS COMPANY of PA.
Mertztown • Pennsylvania

SOFT WATER

Soft, iron-free water for sudsier baths, better shaves, cleaner washes, and remarkable savings on soap and cleaning compounds. Soft water is

## A POSTWAR MUST FOR YOUR CITY

A MUST because it can do so much toward the happiness and prosperity of your citizens. Put it in your plans now for a better postwar city.

Refinite conditioned water is now enjoyed by many municipalities throughout the country . . . and Refinite laboratory and technical experts will gladly discuss your water problem with you . . . will show you how your city, too, can have soft water, economically! Write Refinite. There's no obligation.

"Conditioned Water—An Investment that Pays for Itself!"

**The Refinite Corporation**

Write for Free Catalog 108 Refinite Bldg. Omaha, Nebraska

(*Continued from page 12*)

**George C. Hodges,** Biochemist of the Bureau of Water, Utica, N.Y., died on February 6th, at the age of 87. Born in Watertown, N.Y., he studied at Stevens Inst. of Technology, N.Y. College of Pharmacy, and Columbia University. He taught at the Utica Free Academy from 1881 until 1913. He established an analytical laboratory for the Consolidated Water Co., the predecessor of the present city-owned system, in 1895, the same year that the Mt. Prospect laboratory of New York City was established. These were the first municipal water supply laboratories in the country.

Professor Hodges operated the laboratory on a part-time basis until 1913, then retired from teaching and became biochemist of the water company. Under his direction, Utica became one of the earliest cities to install chlorinators, and was the first to develop chloramine treatment for controlling bacterial tuberculation of long pipe lines. In addition to analytical work, he maintained careful sanitary supervision of the watersheds, and carried out a program of cross-connection elimination.

(*Continued on page 16*)

WATER REFINING
EQUIPMENT HEADQUARTERS
INDUSTRIAL—PROCESS
RAILROAD—MUNICIPAL—HOUSEHOLD

**FILTERS** Of All Types *and* Capacities . . . Gravity . . . Pressure

**SOFTENING SYSTEMS**
All Types *and* Capacities—Zeolites (*synthetic and natural*) and Lime and Soda

**CHEMICAL FEEDERS** (wet or dry)
Acids . . . Hypochlorites . . . Alkalies

**EQUIPMENT FOR REMOVAL**
Of Iron . . . Taste . . . Odors . . . Colors . . . Suspended Matter

SWIMMING POOL EQUIPMENT
AERATORS · DE-GASIFIERS
WATER TEST SETS
RE-CARBONATORS

*The* AMERICAN WATER SOFTENER COMPANY
WATER REFINING EQUIPMENT HEADQUARTERS
INDUSTRIAL · PROCESS · RAILROAD · MUNICIPAL
HOUSEHOLD, ETC.
322 LEHIGH AVE., PHILA., PA.

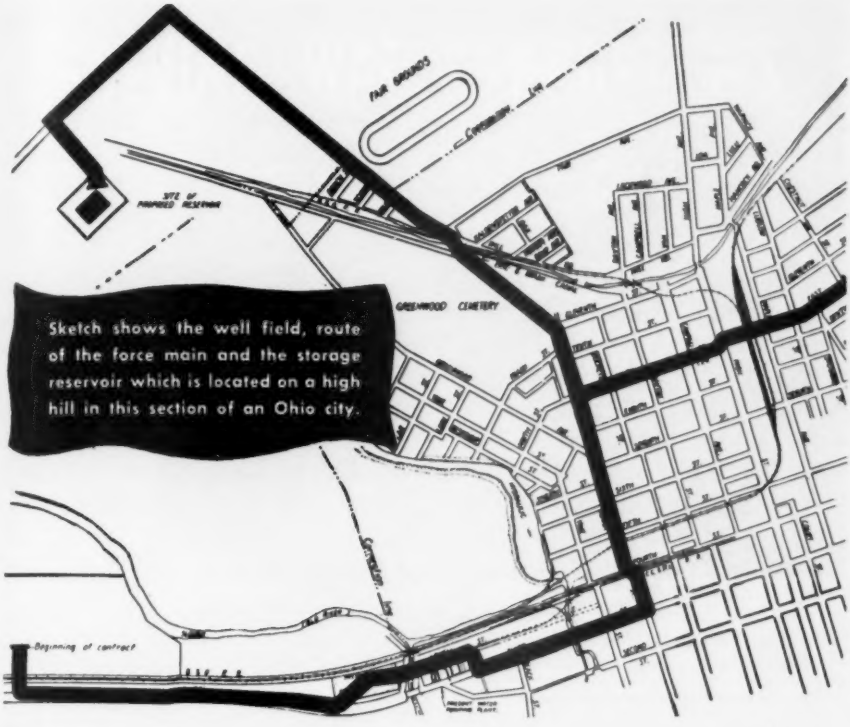
BUILDERS
WATER AND SEWAGE WORKS
*Equipment*

- VENTURI METERS — *Bulletin 293B*
- TYPE M and FLO-WATCH INSTRUMENTS — *Bulletins 324 and 318A*
- VENTURI EFFLUENT CONTROLLERS — *Bulletin 321A*
- FILTER GAUGES — *Bulletin 329*
- LIQUID LEVEL GAUGES — *Bulletins 326 and 329*
- SAND EXPANSION GAUGES — *Bulletin 335*
- KENNISON OPEN FLOW NOZZLES — *Bulletin 334A*
- CHRONOFLO TELEMETERS and CONTROLLERS — *Bulletin 320A*
- TOLEDO-CHRONOFLO CONVEYOR SCALES — *Bulletin 322*

*The above bulletins are available to you.*
*Builders-Providence, Inc.,*
*(division of Builders Iron Foundry)*
*9 Codding St., Providence 1, R. I.*

"BLUE PRINT NOW"

*Sincerely Yours,*
BUILDERS-PROVIDENCE




Sketch shows the well field, route of the force main and the storage reservoir which is located on a high hill in this section of an Ohio city.

# HOW THIS CITY SAVED MONEY on a NEW FORCE MAIN

When plans were drawn for a new 24-inch water force main in a growing section of an Ohio city, engineers specified ARMCO Spiral Welded Steel Pipe. All the money-saving advantages of ARMCO Pipe were utilized in the design of the main.

Requirements for diameter and wall thickness of the pipe were accurately determined. No allowance for tuberculation was necessary because the smooth spun enamel lining provides continuing high flow capacity.

ARMCO Spiral Welded combines low installation costs with long service life. Savings start with hauling and handling. During installation, long 50-foot sections mean fewer connections, less assembly work. Strong tight joints are assured with any type coupling or by field welding.

When you plan your next force main see for yourself how you can save time and money by making use of the advantages of ARMCO Pipe in designing your water transportation system. The American Rolling Mill Co., 1131 Curtis St., Middletown, O.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

**ARMCO**

**SPIRAL WELDED PIPE**

**MEETS A.W.W.A. STANDARD SPECIFICATIONS**

(*Continued from page 14*)

**William Paterson,** Chairman and Mng. Director of the Paterson Eng. Co., Ltd., London, is soon to be knighted, it was recently learned here. It is assumed that his Knighthood derives from his contribution to the British war effort through the production of water treatment equipment. Paterson has belonged to the A.W.W.A. since 1924, and visited this country about two years ago.

**Ross L. Dobbin,** past Pres. of the A.W.W.A., has published as a memorial to his father, F. H. Dobbin, a history of his town, Peterborough, Ont. It is called "Our Old Home Town," and is a collection of articles on former days in the Peterborough area, written by the senior Dobbin for the local paper. Dobbin was a newspaper man and one-time Pres. of the Canadian Newspaper Association. Some of the material was gathered by his son. Among other out-of-the-way items is an article on "How Early Settlers Managed the Water Levels." The book appears under the imprint of J. M. Dent & Sons.

Ross L. Dobbin is Gen. Mgr. of the Peterborough Utilities Com.

(*Continued on page 20*)

*Yes,*

**We're Still Making Time-Tested Mono-Cast Centrifugal Pipe**

**Under suitable priorities, of course. Fittings also available.**

*NOTE: Foresighted managers are planning now to replace substitutes with Cast Iron Pipe at war's end.*

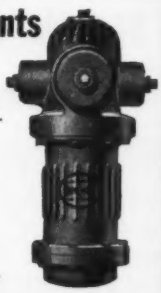
**American Cast Iron Pipe Company**

BIRMINGHAM, ALABAMA

Sales Offices in Principal Cities

**Vogt Fire Hydrants**

**Standard—**
**"Traffic Model"—**
**Flush Type—**
**Water Crane—**
**Type**



**Vogt Gate Valves**

**Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit any Type Pipe.**

**Also—Floor Stands, Shear Gates—Tapping Sleeves and Valves, Flap Valves and Mud Valves.**

**Vogt Brothers Mfg. Co.**
INCORPORATED
MAIN AT 14th ST.
LOUISVILLE KENTUCKY

# SOLVING WATER PROBLEMS —at the Pumping Station!

**WATER SUPERINTENDENT:**

"What did we do about corrosion? We solved that problem with Calgon."

HERE'S what water superintendents in hundreds of American cities have done to solve the water problems of their various customers. Scale and corrosion troubles of big and little industrial plants, laundries, restaurants, hospitals and households are all being met by one proven method, the Calgon* treatment.

Calgon prolongs the life of iron and steel water pipe and water-using equipment for the entire community. Inexpensive, since only a few parts per million are needed, added at the pumping station by a simple feeding device, its benefits are felt throughout the system.

The four paragraphs on the right give an accurate resumé of Calgon's action in various phases of this preventive treatment. Read them carefully.

You can help to prevent shutdowns, to keep industrial and domestic water equipment operating at top efficiency. Get the whole story of Calgon's service. Write to us today for complete data relating to your water problems.

*Calgon is the registered trade-mark of Calgon, Inc., for its glassy sodium phosphate products.*

## Calgon solves 4 water works problems

1. **Prevention of scale** from hard, high-bicarbonate waters. Calgon, added at the plant, prevents scale formation in mains, meters and hot-water heaters, throughout the system.

2. **Corrosion control**—Calgon forms a thin protective film on metals and metal oxides at pH values of 5.0 and higher. This reduces the attack of oxygen to such an extent that corrosion ceases to be a problem.

3. **Prevention of "red water"**—Calgon prevents the precipitation of dissolved iron. Thus "red water," either from iron initially present in well water, or from corrosion, can be eliminated.

4. **Stabilization of water** following lime or lime-soda softening. Calgon's ability to prevent precipitation of calcium carbonate stabilizes water to the ends of the system.

HAGAN HALL BUROMIN CALGON

calgon, inc.

A SUBSIDIARY OF HAGAN CORPORATION

HAGAN BUILDING PITTSBURGH PA.

(*Continued from page 16*)

**Ellwood H. Aldrich,** Cons. Engr., is continuing the engineering practice of Newsom and Aldrich under his own name, since Reeves Newsom retired on March first to take up other duties. Aldrich is maintaining the offices at 500 Fifth Ave., New York, and the Goodwin Bldg., Williamsburg, Va.

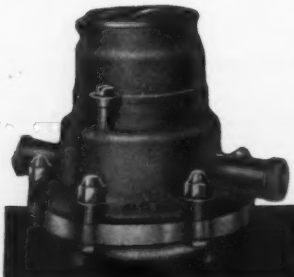
Aldrich studied at Beloit College, Mass. Inst. of Technology, and the University of Illinois. He served overseas in the French Army and then as a Lieutenant in the American Army in the First World War, and upon his return became City Engineer of Wisconsin Rapids, Wis. In 1925 he went to Morris Knowles, Inc., Cons. Engrs. in Pittsburgh, and after two years joined Nicholas S. Hill Jr. in New York. From 1930 to 1938 he was engaged in various activities including private practice, the design and supervision of construction of a water system and sewerage investigations for Lingnan University, Canton, China. He was also engineer with the Water Bureau of the N.Y. Public Service Com., and Chief Engineer of the Community Water Service Co. during part of this period.

As a partner of Newsom since 1938, Aldrich has been engaged in the construction and valuation of water or sewerage projects in many cities. Among the largest of these were the design and construction of additional water supply, filtration plants, and pumping stations for the Cities of Norfolk, Newport News and Hampton Roads area, Va., now approaching completion, at a cost of over $7,000,000.

Aldrich has been active in the A.W.W.A. and at present is Supervising Co-ordinator of the Com. on Survival and Retirement Experience with Water Works Facilities. This committee was organized early in 1941 to secure accurate and comprehensive data relating to the survival and retirement history of the various main elements of water works facilities in typical plants in the U.S. and Canada for the purpose of assisting in planning, financing, designing, managing, and operating such facilities. Aldrich was active in initiating such a study by papers before the A.W.W.A., given in collaboration with Newsom, and based upon a similar study of the Springfield, Mass., pipe system.

(*Continued on page 40*)

**NIAGARA IRON CASE WATER METERS**

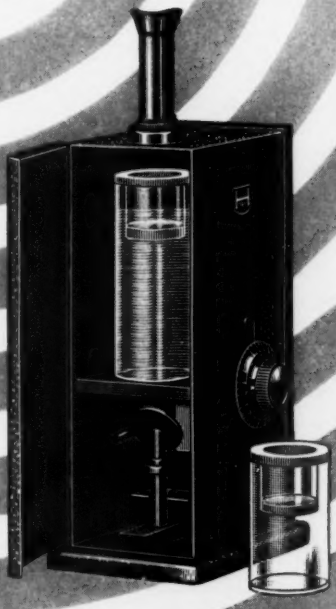


provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

**WRITE FOR CATALOG.**

**BUFFALO METER COMPANY**
Established 1892 2914 Main St., Buffalo, N. Y.

# HELLIGE TURBIDIMETER



This instrument can be used not only for turbidimetric analyses of water but also for sulfate determinations and measurements of suspended matter in various colorless or colored liquids, as found in many industries. Standard suspensions are not needed. Operates on the Tyndall principle. Determinations are made rapidly and with exceptional accuracy.

HELLIGE, INC.

3718 Northern Boulevard
Long Island City 1
New York

(*Continued from page 20*)

**"With fuel, oil and manpower** becoming more scarce as the war progresses, engineers responsible for heating and ventilating industrial buildings are in a position to assist in the conservation of these resources," says Davis M. DeBard, Deputy Dir., Conservation Div., WPB, in Release WPB–BP–1.

"The principal sources of reducing heat losses or heat recovery in many industrial plants are in (1) general over-all efficiency and careful operation of heating plants; (2) reduction of air normally exhausted to the outdoors, which in turn requires a volume of make-up air (to be heated during cold weather) equal to the volume exhausted; and (3) utilization of exhaust steam from drop hammers, and other steam driven apparatus. In winter, air is heated, circulated and discharged to the outdoors, while in summer it is cooled and discharged; both require energy. Reducing the amount of air exhausted saves fuel.

"While individual installations may have other problems, most plants can cut heat costs and save fuel by observing simple precautions: (1) exhaust the *minimum* amount of air needed for oxygen replacement; (2) use a maximum of exhaust steam for heating purposes; (3) return a maximum of steam condensate to boilers.

(*Continued on page 42*)

EDSON

DIAPHRAGM PUMPS

*Hand Operated--sizes 2", 2½", 3", 4"*
*Power Operated--sizes 3" and 4"*

*Open Discharge or Force Pump*
*Skid, Truck or Trailer Mounted*

COMPLETE PUMP OUTFITS

*Edson Pumps - Suction Hose*
*Brass Couplings - Bronze Clamps*
*Red Seal Diaphragms*
*Brass Strainer or Foot Valve*
*Hose Spanners - Adapters - Etc.*

*Also*—Brass Hydrant Pumps

THE EDSON CORPORATION

Main Office and Works: 49 D St., South Boston, Mass.

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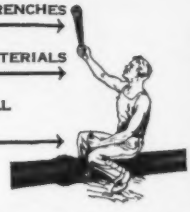
3 *Money, Time and Labor Saving Features of*

UNIVERSAL
CAST IRON PIPE

LAID WITH ONLY WRENCHES

NO CAULKING MATERIALS

NO GASKETS. NO BELL HOLES TO DIG.



For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.

*Dept. C*
THE CENTRAL FOUNDRY COMPANY
386 FOURTH AVENUE, NEW YORK 16, N. Y.

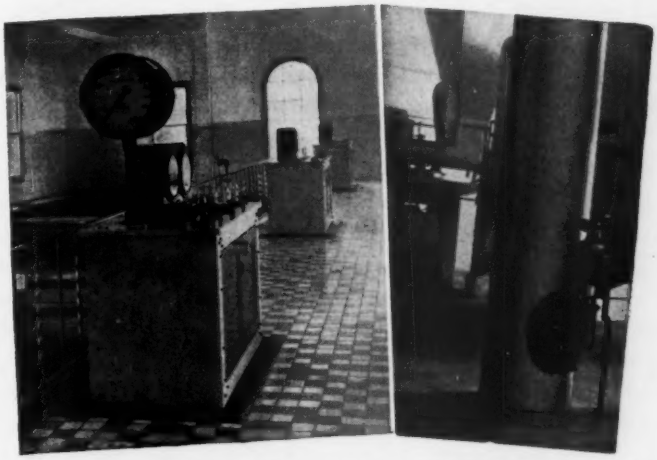
Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.

NAME_____

STREET_____

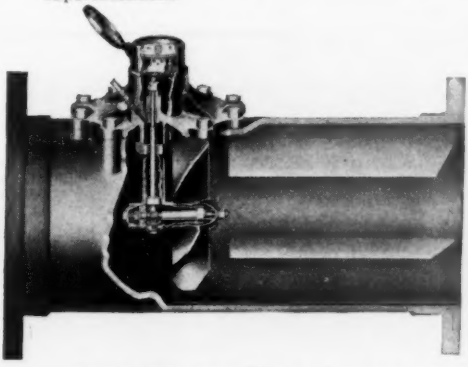
CITY_____

# SPARLING MAIN-LINE METERS



*50 Installations at Beverly Hills, California*

Since 1924 we have supplied the water department of the movie moguls with main-line meters. The one above, installed in 1937, is a 16-inch meter operating a Town Clock Rate of Flow Indicator. The dual faces are readily visible from either end of the gallery. Taylor and Taylor are the consulting engineers. Clyde Kimball is superintendent.



**Types and Sizes for Main-Lines from 2-inch up**

Each Sparling Meter is a complete totalizing unit —the propeller revolving in the flow is geared directly to the Totalizer, as shown. Flanged, Bell & Spigot and Threaded tube-mounted meters; also Saddle-mounted for easy installation on lines in place. The meter in upper right illustration is saddle-mounted on a vertical pipe.

*Bulletin 308 comes at your request*

R. W. SPARLING

*Manufacturer of Water Measuring Equipment*

LOS ANGELES 54.....Box 3277 Terminal Annex
CHICAGO 16.....3104 South Michigan Ave.
BOSTON 8.....6 Beacon Street
622 Broadway.....CINCINNATI 2
101 Park Avenue.....NEW YORK 17

(*Continued from page 40*)

"There is another important reason for fuel conservation today," DeBard's statement concludes. "At the present outlook there will be a substantial coal shortage in the United States—estimated around 20,000,000 tons—for the 12 months period ending April 30, 1945. The world coal shortage is expected to be many millions of tons greater."

**Steel is now available for drums** for arsenical insecticide shipments, as the result of military contract cancellations, the WPB has announced, in Release WPB–LD–315. C. P. Given, packaging officer of the Chemicals Bur. of WPB, has estimated the shift from fibre containers will require about 8,000 tons of steel and says that permission will be granted for use of only minimum gages, 26 gage being agreed on for 100-lb. drums. Because of the thinness of the new steel drums, their re-use will not be expected, he says. Three months' supply of drums will be authorized at a time, according to Given, but manufacturers will be expected to use the fibre now on definite order before switching to steel. No difficulties are expected in meeting the industry's requirements for multi-walled and smaller bags, but the paper situation is still such as to make the carton supply situation difficult.

(*Continued on page 44*)


# SAVE MANPOWER!

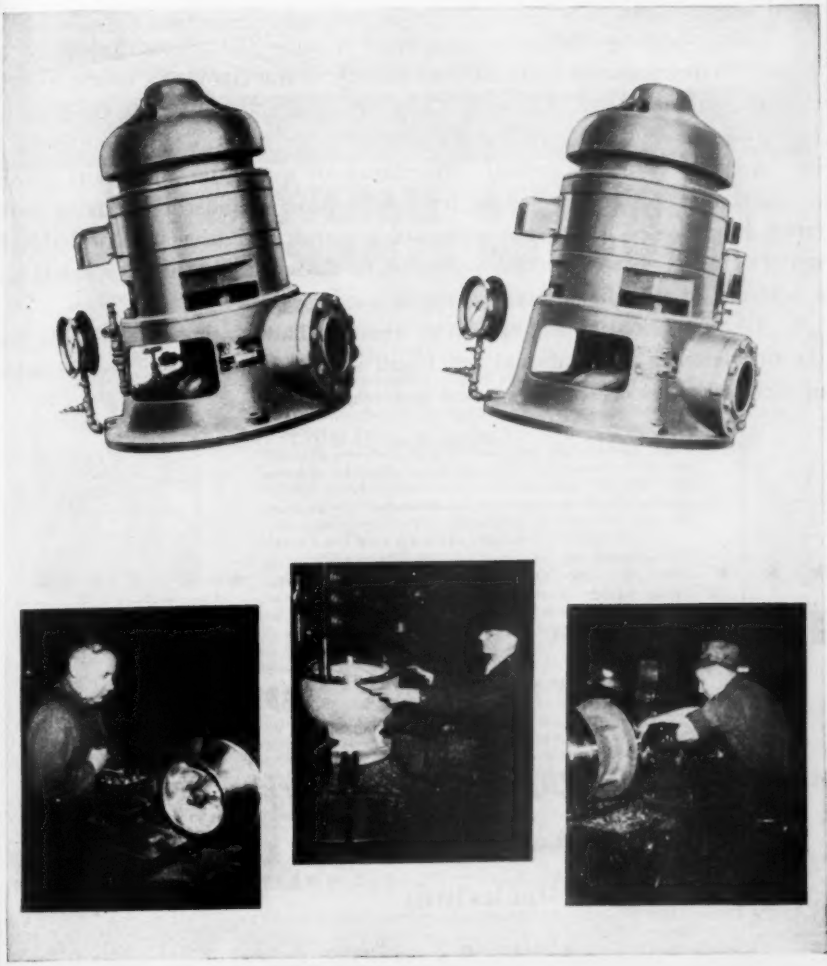
**The need for conserving manpower is currently stressed due to war-time conditions. This has influenced the use of motor operated valves on many war projects.**

**After the war, you may find it well worthwhile to consider using these valves in your water plant where frequent operation is necessary.**

*Write for information*

**RENSSELAER VALVE CO., TROY, N. Y.**

# American Turbines



**Send for these Bulletins**

**No. 245—Water Lubrication** **No. 247—Oil Lubrication**

(*Continued from page 42*)

**Canada is planning a "Department of Reconstruction"** in the Dominion Government, to "promote and co-ordinate planning for national development and postwar development." Its formation was announced by the Governor General, the Earl of Athlone, when he opened the Parliament's latest session.

Other postwar measures suggested include the establishment of an industrial development bank as a subsidiary to the Bank of Canada, for the encouragement of conversion of war plants and of small and medium-sized industrial enterprises, and for the provision of additional credit facilities for fixed and working capital. Insurance or guarantee of export credits to assist in developing postwar trade extension of existing housing legislation is proposed. The expansion of research activities will probably be underwritten. Provision for a price floor under staple farm products and a revision of the Bank Act are urged.

Athlone stated in his speech to the Parliament that he believed that the provision of international relief will help to maintain full employment of manpower and resources in the postwar period.

(*Continued on page 46*)

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**Back the Attack**
**WITH WAR BONDS**

***America's Most Popular Water Works Products***

**Activated Alum**

**Blackalum**

**Palmer Surface Wash Systems**

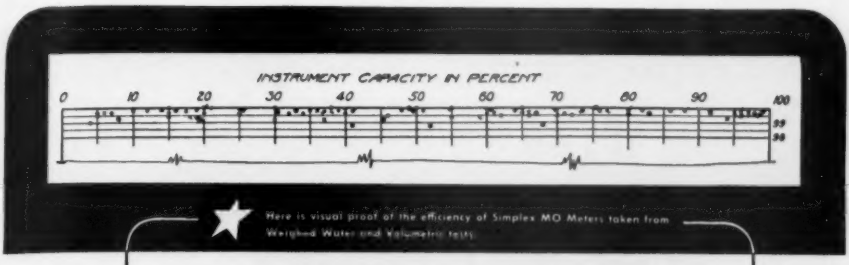
**(designed, fabricated, installed)**

**Write for details—no obligation.**

STUART-BRUMLEY CORP., 516 N. CHARLES ST., BALTIMORE-1, MD.

STUART-BRUMLEY

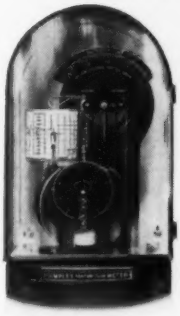
ACTIVATED ALUM • BLACKALUM • PALMER FILTER BED AGITATORS




Here is visual proof of the efficiency of Simplex MO Meters taken from Weighed Water and Volumetric tests.

# *The* OVERALL ACCURACY of the SIMPLEX MO METER

## AS SHOWN BY WEIGHED WATER and VOLUMETRIC TESTS



The matter of final concern to the user of a flow rate meter is the overall efficiency of the instrument — whether its purpose is to indicate, record, or totalize the flow.

The efficiency of sixteen Simplex MO Meters when tested in place by weighing scales and checked by the volume of standpipes is here illustrated. The data was taken at random from routine records of wide-range tests conducted by the laboratory of Simplex Valve & Meter Co. These accuracies speak for themselves.

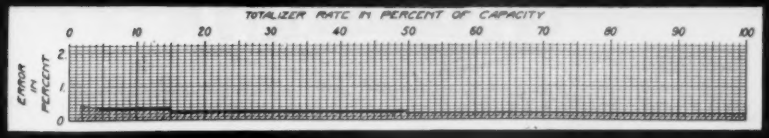
In addition to its inherent accuracy, the Simplex MO Meter operates on a simple trouble-free principle which assures extreme sensitivity over the entire meter range. An applied differential head of ¼ inch of water or less is sufficient to cause functional operation of this instrument. Any change in the rate of flow through a primary device is instantaneously and accurately recorded on the Simplex Meter Chart.

In the unique totalizer design, a frictionless vertical movement of the assembly occurs with flow changes. Constant speed revolution of a friction disc through the variable horizontal speed of a traction roller integrates the rate of flow. The result is highly dependable, accurate totalization of flows over the entire range of the instrument.

Investigate the exceptional values of the Simplex MO Meter. Write today for Bulletin 300.

**SIMPLEX VALVE & METER CO.**
6784 UPLAND STREET, PHILA. 42, PA.

An error curve showing totalizer rate in percent of capacity against actual weighed water.



(*Continued from page 44*)

**MEET THE AXEES**
**The Gremlins of Accidents**

*Better shun this brat named Pyro,*
*Or you'll wake up with a cry of*
*"Fire—Oh!"*
*He brings trouble in large batches*
*With his cigarettes and matches.*
*Be sure that you're alert enough*
*To keep him out—for he's hot stuff!*

NATIONAL SAFETY COUNCIL

**"Meet the Axees"** is a new feature being distributed by the National Safety Council for the promotion of greater safety consciousness. The five members of the gremlin family responsible for accidents are: Sly, who causes falls; Pyro, who starts fires; Elec, who deals in electrical shocks; Zany, the screwball horseplay kind; and Blinky, the lazy, put-it-off dope. Water works plants or manufacturers who have company publications might find useful the sketches of the gremlins with accompanying verses provided by the Council. Mats or proofs sufficiently clear to permit reproduction may be obtained from Paul Jones, Director of Public Information, National Safety Council, 20 North Wacker Drive, Chicago 6, Ill.

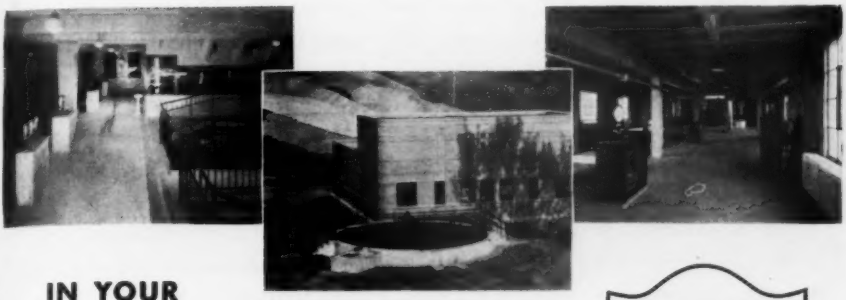
**The Simplex Valve & Meter Co.,** Philadelphia, has appointed five new Sales Representatives, in territories from Ohio to Oregon. R. O. Luchtenberg of Columbus is covering Southwest Ohio. R. S. Stover of Marshalltown, Iowa, is covering his home state and Nebraska. In Southern Illinois and Eastern Missouri, the Case Engineering Co. of St. Louis is the representative. The Jim Clark Agency, Milwaukee, covers Wisconsin and Minnesota, and in Northern California and Southern Oregon Carl F. Noel is the new appointee.

(*Continued on page 50*)

ZECO GREENSAND ZEOLITE

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

**ZEOLITE CHEMICAL CO.**
**90 WEST STREET** **NEW YORK 62, N. Y.**



**IN YOUR POST WAR PLANNING**

*Remember—*

**The INFILCO Equipped Water Purification Plant CENTRALIZES EQUIPMENT RESPONSIBILITY AND ASSURES COORDINATED RESULTS**

You are invited to make use of the experience gained by Infilco during the 40-odd years of designing and manufacturing every type and size of water purification equipment.

In furnishing everything required for water conditioning—from Accelators to Zeolites—Infilco offers you the important advantage of undivided responsibility for successful equipment operation.

And—your plant will be in step with modern developments, because Infilco has always been the first to introduce and adopt worthwhile improvements, as well as first to discard anything proving to be a hindrance to progress.

The services of its staff of experienced engineers and laboratory facilities are at your disposal for the asking.

INFILCO
INCORPORATED
325 W. 25TH PLACE • CHICAGO, ILL.

INFILCO

**PRODUCTS**

Accelators
Aerators
Automatic Controls
Chemical Feeders
Clarifiers
Coagulators
Digesters
Dosing Siphons
Filter Equipment
Flow Controllers
Flow Gauges
Fluorex Purifiers
Gravity Filters
Hydraulic Controls
Hydraulic Switches
Hydrodarco Purifiers
Level Controls
Lime Slakers
Loss of Head Gauges
Mixing Equipment
Pressure Filters
Proportioners
Recarbonators
Rotary Distributors
Samplers
Settlers
Sewage Activators
Sewage Equipment
Sewage Griductors
Venturi Tubes
Wagner Underdrains
Water Filters
Water Softeners
Zeolites

(*Continued from page 46*)

**"Bill" Orchard,** Genl. Mgr. of Wallace & Tiernan Co., Inc., was recently named Citizen No. One of the Oranges and Maplewood, N.J., for 1943 by the Chamber of Commerce and Civics of the Oranges and Maplewood. An "Organization Award for Outstanding Service" was made by the same group to the defense councils of the five municipalities.

Orchard's outstanding service in 1943 was the co-ordinating of industrial facilities to mesh with efforts of the War Manpower Commission in combatting problems of labor shortages at war plants. Orchard was chairman of a committee formed from various Chambers of Commerce and employer associations. The result of the committee's efforts was that the Newark area was kept off the WMC's "critical" list, and WMC Executive Director Lawrence A. Appley recently cited Orchard's contribution to this achievement.

Orchard has lived in Maplewood, a residential town near the Wallace & Tiernan plant in Belleville, for 25 years, and was one of the founders and is the present Pres. of the Maplewood Citizens' Com. He is also Treas. of the Maplewood Community Service, Chairman of the Maplewood Planning Com., and a former Pres. of the Maplewood Civic Assn.

**The Safety Research Institute** has announced the following results of a survey of fire department practice: "About one third of the fires put out by municipal fire departments in the United States are extinguished with hand equipment. Of the fires extinguished before the arrival of the fire department, about seventeen per cent are known to have been put out with hand extinguishers.

"The survey reveals that 41,657 fires were extinguished, during the year 1942, by the 191 fire departments participating in the survey, 28,033 with heavy equipment and 13,624 with first aid equipment. In these same cities, 3,140 fires were put out by persons on the scene before the fire department arrived.

"Nine of the fire chiefs represent cities with over 100,000 population; 16 represent cities of 50,000 to 100,000; 35, cities of 25,000 to 50,000; 63, cities of 10,000 to 25,000, and 68 represent cities of less than 10,000 population."

The Institute has compiled the information obtained in the survey in chart form, useful in safety education, and it is available on request from the Safety Research Institute, 420 Lexington Avenue, New York 17, N.Y.

(*Continued on page 52*)

***PREVENT WEAR AND CUTTING of rods, plungers and shafts by using***

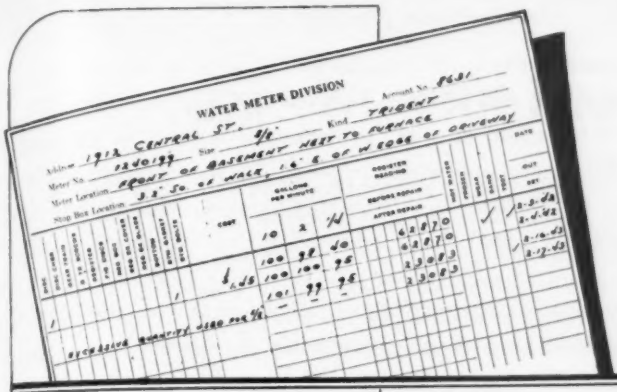
MABB'S

**MABBS RAWHIDE PACKING**

**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**



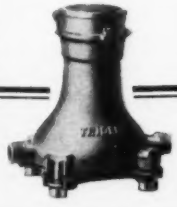

PART OF THE RECORD OF A 28-YEAR OLD TRIDENT METER

*Let us help you plan your Meter Testing Program*

YOUR Trident representative, with knowledge gained by many years as a meter specialist serving Water Works in his territory, is prepared to assist you in matters of

. . . testing and repair methods
. . . record forms
. . . meter shop layout
. . . tools required

and in other matters of meter shop practice related to the more efficient and profitable operation of your Meter Department. Even a Department operating only a hundred meters or so is not too small to profit by Trident Service.



**NEPTUNE METER COMPANY • 50 West 50th Street • New York 20, N. Y.**
Branch Offices in CHICAGO. SAN FRANCISCO. LOS ANGELES. PORTLAND. ORE.. DENVER. DALLAS. KANSAS CITY. LOUISVILLE. ATLANTA. BOSTON.
Neptune Meters. Ltd.. Long Branch. Ont., Canada

(*Continued from page 50*)

**Col. W. F. Rockwell,** Pres. of Pittsburgh Equitable Meter Co.-Merco Nordstrom Valve Co., has resigned his post as Director of Production for the U.S. Maritime Com. in order to devote his efforts to the war work being done by the several industries in which he has interest. The recent death of Walter H. Parker, Vice-Pres. in Charge of Manufacturing at Pittsburgh Equitable, increased the necessity for Col. Rockwell to return to his desk.

While Col. Rockwell was Chairman, the Production Div. of the Maritime Com. directed the launching of the greatest fleet in history.

Other officers of the Pittsburgh Equitable Meter Co. now in the service of the country are: Vice-Pres. and Chief Engr. Allen D. MacLean, now Asst. Director of Production for the Maritime Com.; Vice-Pres. and Sales Mgr. A. E. Higgins, now a Major in the Air Corps; and Vice-Pres. and Controller W. F. Rockwell, Jr., now a Lieutenant in the Army. More than 600 employees of the company are now in the armed forces.

**The Pennsylvania Salt Mfg. Co.** has moved its New York office to 40 West 40th Street, New York 18, N.Y. The New York office is the headquarters of two of the Company's sales districts, one headed by F. G. Rodenburgh and the other by C. A. McCloskey.

**Are your employees trained** in what-not-to-do in fire fighting? Here are a couple of examples of what can happen when there is failure to observe proper security precautions, through ignorance or carelessness:

A motor in the ventilating system of one of the spray booths in an aircraft parts factory became overheated, and smoke began to come from the motor. A workman seized the nearest fire extinguisher and played it on the motor. The extinguisher was the soda-acid type, and expelled a strong jet of water against the live motor, and, as a result, burning material was flung about the booth. Some came into contact with highly inflammable lacquer used in the spraying process and a fire resulted which caused damage estimated at $100,000. Of course the workman should have turned off the motor and employed a carbon dioxide, carbon tetrachloride or other Class III fire extinguisher.

In another case, a $418,000 fire started in a war plant building near a master switch box feeding electric current to nearby machines. It was determined that the night before the fire occurred, one of the fuses burned out in the box and a plant employee placed *two* 60-ampere elements in the *one* 60-ampere cartridge. This, of course, permitted twice as much current to flow, resulting in dangerous overheating of the wiring through overloading.

# NEWS OF THE FIELD

**Senior Members of the Association** were listed in the March issue of the JOURNAL. The Honorary Members are here named.

An Honorary Member is a man who, according to the Association's By-Laws, is possessed of "practical or scientific knowledge in matters relating to water supply, and whose accomplishments in that field of endeavor shall entitle him to special recognition by the Association."

The By-Laws further state: "The Board, on its own initiative, or at the request of twenty-five members of the Association, may elect any qualified person an Honorary Member. This election shall take place at a regular meeting of the Board and shall be by ballot. Two negative ballots shall exclude. Each Honorary Member shall receive an engrossed certificate of membership in that grade."

Each year the President of the Association and the two Past-Presidents who immediately preceded him act as a committee to review the Association's membership with a view to the nomination for Honorary Membership of those members whose achievements merit such designation. The deliberations of this special committee are always thorough and are fully intended to be, and are accepted by the Board to be, in the interest of the water works profession, the Association, and the persons thus selected.

In the March JOURNAL it was pointed out that the oldest Senior Members, in terms of years of membership, are William F. Wilcox of Atlanta, Ga., and Emiel A. Croll of Orlando, Fla. The Honorary Members who have belonged to the Association for the longest term are Daniel Webster Mead of Madison, Wis., and James Lawrence Tighe of Holyoke, Mass. They joined in April 1889. Mead was elected to Honorary Membership in 1930 and Tighe received his certificate in 1926.

The latest elections to Honorary Membership were held at the January meeting of the Board. Charles B. Burdick of Chicago, Frank E. Hale of New York, and Thomas H. Wiggin of New York, will receive their certificates of Honorary Membership at the Conference at Milwaukee in June. Their names are included in the following list:

J. Walter Ackerman, *'10*
Washington, D.C.
*Honorary M. '41*

M. N. Baker, *'03*
Upper Montclair, N.J.
*Honorary M. '36*

Frank A. Barbour, *'06*
Boston, Mass.
*Honorary M. '39*

Col. Edw. Bartow, *'06*
Iowa City, Iowa
*Honorary M. '36*

Thos. Brooks, *'25*
Los Angeles, Calif.
*Honorary M. '37*

Wm. W. Brush, *'11*
New York, N.Y.
*Honorary M. '37*

Geo. C. Bunker, *'11*
Caracas, Venezuela
*Honorary M. '43*

Chas. B. Burdick, *'07*
Chicago, Ill.
*Honorary M. '44*

Jas. M. Caird, *'00*
Troy, N.Y.
*Honorary M. '42*

*(Continued on page 2)*

(*Continued from page 1*)

Edw. S. Cole, *'02*
New York, N.Y.
*Honorary M. '43*

Wm. R. Conard, *'04*
Burlington, N.J.
*Honorary M. '43*

Carleton E. Davis, *'12*
Bryn Mawr, Pa.
*Honorary M. '43*

W. W. DeBerard, *'12*
Chicago, Ill.
*Honorary M. '42*

Ross L. Dobbin, *'23*
Peterborough, Can.
*Honorary M. '37*

Geo. H. Fenkell, *'20*
Almont, Mich.
*Honorary M. '40*

Jas. E. Gibson, *'22*
Charleston, S.C.
*Honorary M. '40*

Frank E. Hale, *'08*
Brooklyn, N.Y.
*Honorary M. '44*

R. C. Harris, *'41*
Toronto, Can.
*Honorary M. '41*

C. R. Henderson, *'01*
New York, N.Y.
*Honorary M. '36*

Wm. W. Hurlbut, *'24*
Los Angeles, Calif.
*Honorary M. '43*

Chas. Gilman Hyde, *'07*
Berkeley, Calif.
*Honorary M. '39*

Harry E. Jordan, *'19*
Port Washington, N.Y.
*Honorary M. '39*

John A. Kienle, *'09*
Grasonville, Md.
*Honorary M. '40*

Theodore A. Leisen, *'04*
Detroit, Mich.
*Honorary M. '38*

Beekman C. Little, *'03*
Rochester, N.Y.
*Honorary M. '39*

Danl. W. Mead, *'89*
Madison, Wis.
*Honorary M. '30*

Denis F. O'Brien, *'35*
East Orange, N.J.
*Honorary M. '35*

Wm. J. Orchard, *'17*
Newark, N.J.
*Honorary M. '37*

Jas. L. Tighe, *'89*
Holyoke, Mass.
*Honorary M. '26*

W. E. Vest, *'11*
Charlotte, N.C.
*Honorary M. '42*

Edw. E. Wall, *'04*
St. Louis, Mo.
*Honorary M. '36*

Thos. H. Wiggin, *'22*
New York, N.Y.
*Honorary M. '44*

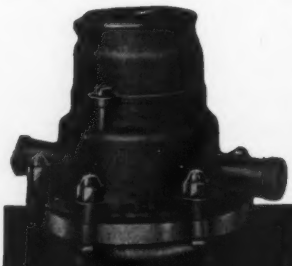
**J. A. Krug, Vice-Ch. of W.P.B.,** will probably be in either an Army or a Navy uniform by the time this issue of the JOURNAL reaches its readers. Krug, 36 and a pre-Pearl Harbor father of two, requested that no deferment on occupational grounds be sought for him by his boss, Donald M. Nelson. He had been assured that he could have had a deferment but he says that he is "absolutely willing to go into service."

Krug is the subject of a tribute by Arnold Kruckman in a column called "Washington News for the Construction West" in the February issue of *Western Construction News*. Kruckman says:

"The word among informed people in W.P.B. is that the man rising most definitely to power is Vice Chairman J. A. Krug, director of the Office of War Utilities. His present domain includes power, gas, domestic water, and communications embraced in one group, and the motiva-

(*Continued on page 4*)

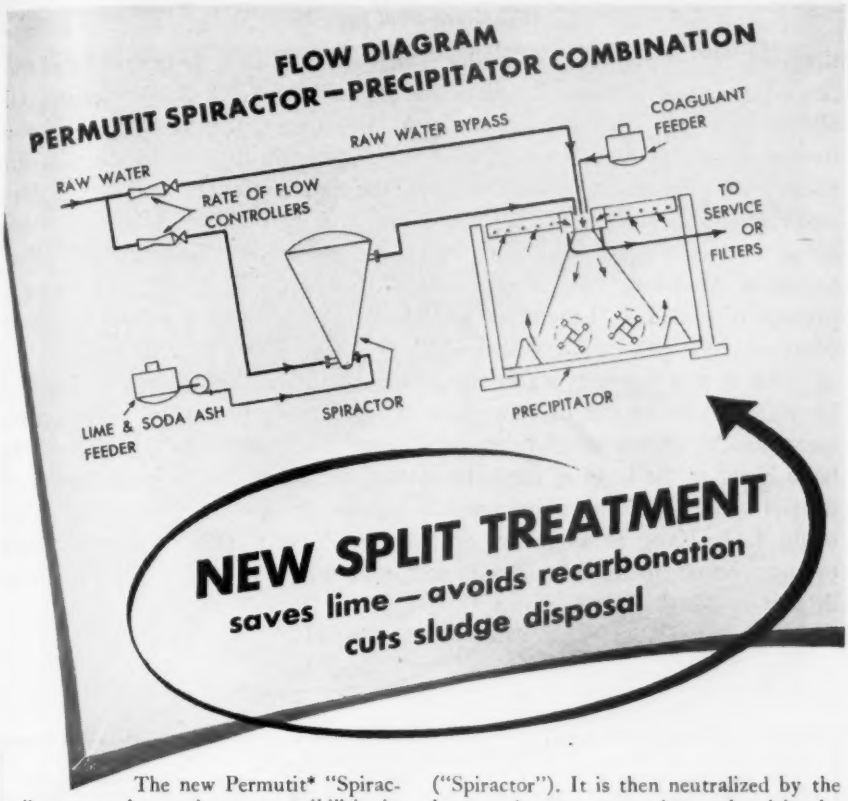
**NIAGARA IRON CASE WATER METERS**



provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

**WRITE FOR CATALOG.**

**BUFFALO METER COMPANY**
Established 1892 2914 Main St., Buffalo, N.Y.




The new Permutit* "Spiractor" opens up interesting new possibilities in the treatment of municipal water supplies. The "Spiractor" is ideal for removal of calcium because it requires small space and low investment and because it minimizes the need for sludge disposal. Precipitates are removed by plating out on the catalyst granules, rather than as a dilute sludge.

For magnesium removal, the "Spiractor"–Precipitator combination is indicated. Utilizing the best features of both types of equipment, the calcium is removed in the "Spiractor" and the magnesium in the Precipitator. Where magnesium hardness must be reduced below 5 grains per gallon, split treatment as shown in the diagram is advisable. The major portion of the hard water is treated with all the lime and soda ash in the first stage ("Spiractor"). It is then neutralized by the by-passed raw water and coagulated in the second stage (Precipitator). This means a saving in lime and soda ash equivalent to the causticity (hydroxide alkalinity) which would normally be needed in one-stage treatment to obtain the same magnesium in the effluent.

Split treatment also eliminates recarbonation. Effluent of the second stage is stable and contains no causticity, so that water is of low enough pH value to go directly to the distribution system.

Existing lime soda plants can often be modernized advantageously by adding the "Spiractor" as a first stage. Write for full details to The Permutit Company, Dept. G2, 330 W. 42nd St., New York 18, N. Y. In Canada: Permutit Company of Canada, Ltd., Montreal.

* Trademark Reg. U. S. Pat. Off.

PERMUTIT
BETTER WATER
MEANS HAPPIER CITIES
...Plan it NOW!
WATER CONDITIONING HEADQUARTERS

(*Continued from page 2*)

tion of W.P.B. program in another which includes the chairmanship of the powerful and important Requirements Committee (which determines all allocations), and the military division, the urgency rating division, the foreign division, the stockpiling and transportation division, industrial division, the production controls bureau, the distribution bureau, the orders and regulations bureau, the appeals board, and the order clearance division. Krug . . . is a product of the radical period in the University of Wisconsin at Madison, and came into W.P.B. from T.V.A. where he was a protege of David A. Lilienthal, another product of the same influences at Madison."

All of this interests water works men greatly. To those who know a bit about Washington in these war days, Krug's poise and positiveness mean much. Some day utilities will know how lucky they have been to have Krug at the head of their division of the W.P.B. and in the spirit of utmost cooperation with the war effort, one can ask this question—what could J. A. Krug in an Army or Navy uniform possibly do, that would even approach, in its value to the nation at war, what he has been able to do as a civilian?

(*Continued on page 6*)


# SAVE FOR VICTORY

**EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.**

***Now is the time to do your part—SAVE FOR VICTORY***

## National Water Main Cleaning Co.

**30 Church St., New York, N. Y.**

**BRANCHES**

**115 Peterboro St., Boston, Mass.**
**910 William Oliver Bldg., Atlanta, Ga.**
**7103 Dale Ave., St. Louis, Mo.**
**576 Wall St., Winnipeg, Man., Canada**
**3812 Castellar St., Omaha, Neb.**
**205 West Wacker Drive, Chicago, Ill.**
**501 Howard St., San Francisco, Calif.**
**2028 Union Ave., Montreal, Canada**
**P. O. Box 683, Jacksonville, Fla.**

*Artistry and Water Tanks*

**TIME** will be, and we hope soon, when photographers can direct their artistry toward new water tanks for municipal service. The tank shell and balcony that the photographer shows here against a deep blue sky is a 500,000-gal. installation of the very functional Colonial design. Write for quotations.

**CHICAGO BRIDGE & IRON COMPANY**

BIRMINGHAM
PHILADELPHIA
SAN FRANCISCO
CHICAGO
NEW YORK
HOUSTON
WASHINGTON
CLEVELAND
TULSA

(*Continued from page 4*)

**To top off London's troubles,** that battered town is now faced with a water shortage due to lack of rainfall. London draws the major portion of its water from the Thames, which, according to Henry Berry, Ch. of the Metropolitan Water Bd., is now carrying less than ⅓ its normal flow. A reduction of 20 per cent of the normal peace time consumption of water for this period will mean sufficient water for everyone, Berry states. Normal consumption is 300 mgd. for 7,250,000 people.

The British Labor Party is now proposing in Parliament that Britain's water supply be made a national public utility. Water supply is now administered there by 78 local authorities, 48 joint boards, 175 companies with statutory powers, 8 other companies, and at least 1000 private owners.

**Kenneth E. McFarland,** former Mech. Engr. with the Municipal Service Co., Kansas City, Mo., has become City Engr. of Midland, Tex.

**Cpl. Robert M. du Bruyne,** formerly Chemist in the Water and Light Dept. of Gastonia, N.C., is now located at Rutgers University, New Brunswick, N.J.

(*Continued on page 8*)

SYNTRON

ELECTRONIC CONTROLLED VIBRATORY FEEDING OF DRY CHEMICALS

*"Vibra-Flow" VOLUMETRIC*

FEEDER MACHINES

Control the volume flow of dry chemicals and other bulk materials.
Rheostat control of rate of feed.
Vibrated, non-arching hopper.
Can also be automatically controlled by pH indicators, venturi meters, etc.

*"Weigh-Flow" GRAVIMETRIC*

FEEDER MACHINES

Provide a positive accurate and automatic "Weigh-Flow" of chemical.
Eliminate all guess work—and feed exactly the right amount—by weight.
Predetermined setting of scale automatically maintains desired weighed flow of material per unit of time.

*Sizes and styles available for your chemical feeding problem*
*Investigate their many advantages*

**SYNTRON COMPANY, 428 Lexington Ave., Homer City, Pa.**

# FOR PROMPT POSTWAR ACTION

## ON YOUR WATERWORKS IMPROVEMENT PROJECT . .

# Blueprint Now!

No better time than now to put your plans on paper—ready to build with *ahead of the field* when the postwar scramble begins. Today's completed plans may require future minor changes—but it's easier to alter detail then, than to start from scratch when the rush is on!

We invite you to use the wide experience of this organization in engineering your improvements of tomorrow.

**PITTSBURGH·DES MOINES STEEL CO.**

PITTSBURGH, PA., 3424 NEVILLE ISLAND—DES MOINES, IOWA, 925 TUTTLE STREET
NEW YORK, ROOM 921, 251 BROADWAY · CHICAGO, 1228 FIRST NATIONAL BANK BUILDING
DALLAS, 1229 PRAETORIAN BUILDING · SAN FRANCISCO, 631 RIALTO BUILDING
SEATTLE, 1132 EIGHTH AVENUE, SOUTH

(*Continued from page 6*)

**William F. Ayars,** Supt. of the Salem, N. J., Water Dept., died suddenly on January 21. He had been a member of the New Jersey Section, A.W.W.A., for 25 years, and had served it as Trustee and as Chairman.

The Section's news sheet, *The Pipe Line,* tells that when, in 1923 a drought hit the state and dried up the local water supply, Mr. Ayars was serving on the Council in his home town and was Chairman of the Water Com. He persuaded the water dept. to pump water from another source and kept the system going.

Another time, Mr. Ayars "stood out for a new and larger standpipe," *The Pipe Line* narrates, "when the Mayor . . . opposed it on the basis that the pumps could not possibly lift the water against a tank with such a large diameter. In fact, the mayor appeared at the opening ceremony and declared he would have many witnesses to the failure of the system to work. Need we say he didn't run for reelection?"

"Later," *The Pipe Line* continues, "the home town boys realized that Bill was a natural to run the system. He ran a good part of the town along with it, but was too modest to say so."

**Thorndike Saville,** Dean of the College of Eng., New York University, received the degree of Doctor of Engineering from Clarkson College of Technology at the 45th commencement exercises held in Potsdam, N.Y., rcently.

**Capt. Francis M. Johnson** has been appointed Medical Inspector attached to the Station Hospital, Amarillo Army Air Field, Tex. He was Post Engr. at the Presque Isle Army Air Field, Me., and in civilian life he was San. Engr. for the Dist. Health Dept., Murphy, N.C.

(*Continued on page 10*)

THE COAGULANT
THAT CUTS COSTS

Write today for actual case histories of water plants now using Ferri-Floc.

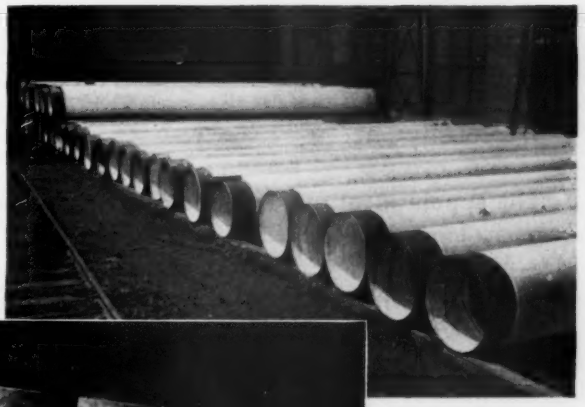
TENNESSEE CORPORATION
ferri-floc
FERRIC SULPHATE

TENNESSEE CORPORATION
ATLANTA, GEORGIA LOCKLAND, OHIO

# ALCO

## ELECTRIC WELDED STEEL PIPE

### PLAIN LENGTHS OR SPECIALS



*36" O. D. Piping Ready for Loading.*

*Special 60" O. D. Header.*

Alco Electric Welded Steel Pipe Insures Against Leakage and Breakage

**AMERICAN LOCOMOTIVE COMPANY**

**ALCO PRODUCTS DIVISION**

30 CHURCH ST., NEW YORK, N. Y. DUNKIRK, N. Y.

(*Continued from page 8*)

**Two long-time associates** of the Pittsburgh-National Meter Co. died recently within two weeks of one another.

John J. McKague, who completed 40 years service on February 13, died three days later. He started his business career in the office of National Meter Co. and since 1917 was salesman for the Eastern Seaboard district. He had been ill for several months preceding his death.

J. W. Fleet who joined the National Meter organization in 1911 died suddenly on March 2 at his home in Brooklyn, N. Y. He was in the Pacific Northwest sales territory for a number of years, later was assigned to New York State and Canada. For over 15 years he served as Sales Mgr. for the National Meter Co., and during recent years has been Dist. Mgr. in Brooklyn for the combined Pittsburgh-National organization.

**The appointment of Professor C.-E. A. Winslow** as Editor of the American Journal of Public Health, succeeding Harry Stoll Mustard, M.D., is announced by the American Public Health Association. The new editor takes office with the April issue.

Winslow, one-time Pres. of the A.P.H.A., is Professor of Public Health at Yale University. His identification with the A.P.H.A. has been long and intimate. He served as Chairman of its Com. on Administrative Practice for 15 years and as Chairman of the Com. on the Hygiene of Housing since its establishment 7 years ago. In 1942, he received a certificate for 40 years of continuous membership and the Sedgwick Memorial Medal for distinguished service to public health.

Winslow also has a wide reputation among heating and ventilating engineers, bacteriologists, and housing experts.

(*Continued on page 14*)

ZECO GREENSAND ZEOLITE

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

**ZEOLITE CHEMICAL CO.**

**90 WEST STREET** **NEW YORK 62, N. Y.**

# in any of the equipment of Everdur*."

Mr. Pinkerton's letter speaks ably for the 14 miles of Everdur* Conduit and 20,000 lb. of Everdur fittings and boxes in Chicago's Southwest Sewage Treatment Plant.

Much of this conduit is installed in long galleries where a turbulent stream runs under gratings, and is exposed to the most severely corrosive conditions existing in this type of installation. Hydrogen-sulfide and sulphur-dioxide are present in the atmosphere and the humidity approaches the saturation point most of the time.

Ideal for sewage plant equipment, Everdur, The American Brass Company's copper-silicon alloy, combines strength, high resistance to corrosion with ready machinability and weldability. It is available in practically all commercial shapes. For detailed information on Everdur Metal write for Publication E-11. 44131-A

**THE AMERICAN BRASS COMPANY**
*Subsidiary of Anaconda Copper Mining Co.*
General Offices: Waterbury 88, Connecticut
*In Canada:* ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

*Reg. U.S. Pat. Off.

*Air view of world's largest sewage plant, Chicago, Ill.*

**EVERDUR METAL**

is used in sewage works for Coarse and Fine Screens, Swing Gates, Built-up Sluice Gates, Coarse Bar Rack Aprons, Effluent Weirs and Scum Weirs, Structural Scum Baffle Brackets, Troughs, Screen Hoppers, Orifices, Baskets, Anchors, Ladders, Float Gage Chains, Valve Springs, Manhole Steps, Guides, Walkways, Bars and Plates, Bolts and Nuts.

*Made by The American Brass Company*

(*Continued from page 10*)

**Fort Lauderdale, Fla.,** a city of 18,000 (1940 Census), now has 9 Active Members in the A.W.W.A. Charles E. Fiveash, Supt. of the Water Works and Sewage Dept. there and Dir. of the Florida Sec., has been acting on the principle "every member of the staff a member of the A.W.W.A." Fiveash has signed up: Frederick R. Boord, Jr. Operator, Treatment Plant; Milton O. Gordon, Jr. Operator, Treatment Plant; E. B. Johnson, Meter Reader; Beverly Alexander MacQuarrie, Chief Operator, Treatment Plant; Hinton H. Mimms, Maintenance Man; George T. Robbins, Relief Operator; Daniel Rode, Sr. Operator, Treatment Plant; and Leo M. Schmuck, Jr. Operator, Treatment Plant.

This is a fine record for a fine city and a fine superintendent. In many a city of equal or greater size, only the superintendent of the water department is a member of the A.W.W.A. The Association salutes Charles Fiveash—a *really* Active Member. It is the sort of activity that a thriving city such as Fort Lauderdale merits. Its population grew from 8,666 in 1930 to 18,000 in 1940. In such a city, public services must be superintended and operated by men who appreciate their responsibilities and work hard to meet them.

(*Continued on page 16*)


# DON'T WAIT - TELL US NOW!

Our representatives will soon be calling upon you and renewing old friendships. We are gradually getting into position to release them for at least part-time travel.

But please don't wait. Now is the time for a seasonal check-up of your Water Works requirements.

Our real job is producing specialized items for our armed forces on the fighting fronts, but we are also producing Water Works Materials for the home front.

You can help us immensely by getting your orders in early so we may provide you with enough and on time.

**HAYS MANUFACTURING CO., ERIE, PA.**

**WATER WORKS PRODUCTS**

**HAYS**

***OUR 75th ANNIVERSARY***

**LET'S ALL BACK THE ATTACK... BUY WAR BONDS!**

# CAST IRON PIPE

*Manufactured in Sizes 2" to 96"—*
*A large stock constantly on hand,*
*facilitating prompt shipment.*

**Flanged Pipe**

**Special Castings**

**Flexible Joint Pipe**

**Bell and Spigot Pipe**

**Warren Spun Centrifugally Cast Iron Pipe**

**Short Body B. & S. Specials**

WF

**Warren Foundry & Pipe Corp.**

*and*

**Warren Pipe Co. of Massachusetts, Inc.**

*Sales Offices*
11 BROADWAY, NEW YORK, N. Y.
75 FEDERAL ST., BOSTON, MASS.

*Works*
PHILLIPSBURG, N. J.
EVERETT, MASS.

(*Continued from page 14*)

**Elton D. Walker,** Professor Emeritus of Civ. Eng., Pennsylvania State College, died on February 24 at the age of 74. He had joined the faculty there in 1900 and was head of the Civil Engineering Dept. from 1907 to 1939, the year in which he retired.

Professor Walker won a B.S. in Civil Engineering from Massachusetts Institute of Technology in 1890. Between that time and 1900, he taught civil engineering at M.I.T. and at Union College.

Professor Walker joined the A.W.W.A. in 1906.

**Fred Merryfield,** Assoc. Professor at Oregon State College, Corvallis, Ore., is back at his post there after a year in the Army, several months of which he spent on duty in Australia and New Guinea. He received a medical discharge.

**Capt. Clyde R. Harvill, Sn. C.,** who was Post Sanitary Officer at Fort McClellan, Ala., is now overseas.

(*Continued on page 18*)

**Sheldon . . . WILL HELP YOU**

**Experienced Sheldon Planning and Installation Engineers will assist you in planning, selecting and installing laboratory control facilities which will meet your needs efficiently.**

*Write today for our Sheldon Catalog showing Wood and Metal Laboratory Furniture. Ask that a Sheldon Engineer call.*

**E. H. SHELDON & CO.**

738 NIMS STREET MUSKEGON, MICHIGAN

# pipeline to BERLIN

**Scene 1.** Part of a large order of six-inch ARMCO Spiral Welded Pipe ready for shipment to the "invasion coast." Mile after mile of this sturdy steel pipe is ready for overseas duty —"somewhere" on the war fronts.

**Scene 2** is yet to come. Inland from the beachheads, Army engineers will lay pipe as fast as the front moves forward. Through these life-lines will flow water, oil and gasoline that keeps an army on the go.

**Scene 3** is postwar, when ARMCO Spiral Welded will be back at old familiar tasks. It is amply strong (ultimate strength of 56-60 thousand pounds a square inch) without the burden of excess weight. You save money on hauling, handling and installation. The long 50-foot sections mean fewer joints, less assembly work. A spun enamel lining assures continued high flow capacity; tuberculation and costly cleaning are out.

Remember ARMCO Spiral Welded when you plan your next pipe line. Diameters 6 to 36 inches, wall thicknesses 7/64 to 1/2-inch. Write for information. The American Rolling Mill Company, Pipe Sales Division, 1471 Curtis St., Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION.

ARMCO

**ARMCO**

**STEEL PIPE**

**MEETS A. W. W. A. SPECIFICATIONS**

(*Continued from page 16*)

**Thomas J. Skinker, Water Comr. of St. Louis, Mo.,** has been made Dir. of Public Utilities there, and Elton E. Easterday, Div. Engr. of the Distr. Sec. of the Water Dept., has been made Acting Water Comr. This is the result of a reshuffling following the resignation of the president of the St. Louis Bd. of Public Service. Skinker is nominally on leave-of-absence from his post as Water Comr., a civil service position, because the Dir. of Public Utilities is a political appointee and a change of government following elections in November or the following April might jeopardize his tenure.

Skinker, who first went to work for the St. Louis Water Dept. in 1914, was an A.W.W.A. Dir. in 1931–32. Easterday has been with the Water Dept. since 1913.

**William R. Wise,** of Newberry, S.C., has been promoted to the rank of Captain and been made Assistant Post Engineer at Camp McCain, Miss. He went to Camp McCain from the Charleston, S.C., Army Air Base.

(*Continued on page 20*)


# SAVE MANPOWER!

**The need for conserving manpower is currently stressed due to war-time conditions. This has influenced the use of motor operated valves on many war projects.**

**After the war, you may find it well worthwhile to consider using these valves in your water plant where frequent operation is necessary.**

*Write for information*

**RENSSELAER VALVE CO., TROY, N. Y.**

# meet with your Postwar planning board

He's an expert on municipal water conditioning . . . he has worked with hundreds of city engineers, consulting engineers, and planning committees . . . time and again his impartial advice and friendly assistance have been of real value in solving many municipal water conditioning problems. He's a Graver engineer . . . and his services are available to you without charge or obligation.

Postwar planning now calls for action. It's time to get those ideas on paper . . . to start the engineering and designing . . . to get estimates on the cost. All of that work can, and should, be done now. Then, when the last shot has been fired and Victory is ours, there need be no delay in getting your equipment into production.

Tell us the nature of your project. There's a Graver engineer ready to help you . . . without obligation.

GRAVER
WATER CONDITIONING EQUIPMENT
43-49W

*Process Equipment Division of*
GRAVER TANK & MFG. CO., INC.
4809-45 Tod Ave., East Chicago, Ind.
NEW YORK CATASAUQUA, PA. CHICAGO TULSA

*Graver designs, builds, and installs water conditioning equipment of all types.*
**Hot Process Water Softeners • Zeolite Water Softeners • Water Filters • Iron Removal Filters • Taste and Odor Removal Filters • Reactivators • Swimming Pool Equipment**

## Erratum

In the advertisement of Ozone Processes, Inc., in the March 1944 JOURNAL, page 27, the word "the" appeared for "no" in the fourth line of the first paragraph.

The paragraph should read:

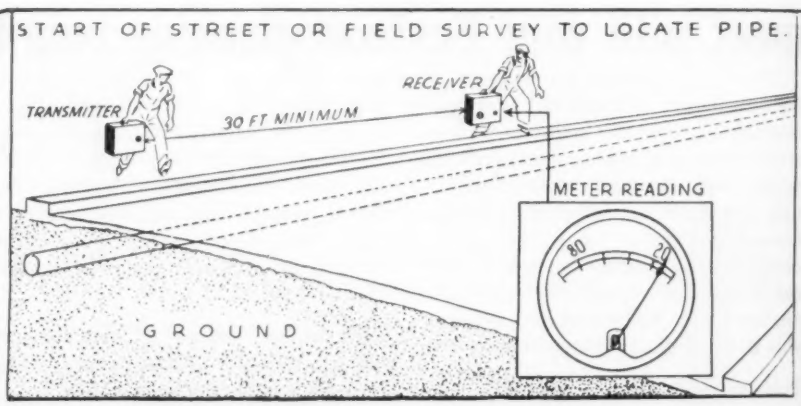
Ozone is a powerful oxidant—some chemists call it activated oxygen. Its principal value in water treatment, especially for the removal of taste and odor, lies in its remarkable ability to "burn-up" (oxidize) taste and odor producing impurities, with the unique advantage of leaving no residue or new chemical in the water.

(*Continued from page 18*)

**Michael J. Stankewich** has leave of absence from his post as Asst. Dist. San. Engr., New York State Dept. of Health, to take up his commission as 2nd Lt., Sn. C. He reported to Carlisle Barracks, Pa., for training on March 10.

**Nolan Dudley,** formerly Mgr. of the Meter Dept. at the Columbus, Ga., Water Works, has become Supt. of Filtration there, succeeding Fred M. Hull.

(*Continued on page 42*)


**M-SCOPE— BURIED PIPE AND CABLE FINDER**

***Exclusively manufactured by the Fisher Research Laboratory***

The M-SCOPE quickly locates the exact position of underground pipe-lines, bends, dead-ends, valves, cast iron bells, stubs, marble obstructions, etc. It determines depth of a pipe-line or metallic conductor. Traces exact course of underground line. It eliminates needless digging and tearing up—saves labor, materials and time.

Write to the Fisher Research Laboratory for latest 16-page booklet explaining the above method.

Please place your order *now* for immediate delivery from our Palo Alto, Calif., or Chicago, Ill., warehouses.

**FISHER RESEARCH LABORATORY**

**PALO ALTO, CALIFORNIA**

# HYDRO-TITE

## AND DRY BRAIDED FIBREX

**A DEPENDABLE SELF-CAULKING JOINT COMPOUND FOR CAST IRON BELL AND SPIGOT WATER MAINS**

**HYDRO-TITE** is a self-caulking sulphur base jointing compound used to joint bell and spigot cast iron water mains and soil pipe. It comes in powder form which insures uniformity and quick melting.

When poured into a joint, HYDRO-TITE immediately solidifies upon contact with the metal and bonds to both the surfaces of the bell and the spigot for the entire depth of the joint. It requires no caulking and after pouring a joint, water pressure may be immediately applied.

**HYDRO-TITE** is easy to use, no skill being required to make joints that are tight from the start. Joints made with HYDRO-TITE will stand any pressure the pipe will stand.

**DRY BRAIDED FIBREX**

### USED LIKE BRAIDED JUTE WILL NOT BREED BACTERIA

**A SANITARY** Packing used in jointing bell and spigot pipe for water, sewer mains and soil pipe.

**FIBREX** was designed for use with Hydro-Tite and other self-caulking compounds, but is entirely suitable also for joints made with lead, and for Sani-Tite and other asphalt sewer joint compounds. Thousands of pounds of Fibrex are already in service on water lines throughout the country.

## HYDRAULIC DEVELOPMENT CORPORATION

**Main Sales Office: 50 CHURCH STREET, NEW YORK, N. Y.**

**Works: WEST MEDFORD STATION, BOSTON, MASS.**

(*Continued from page 20*)

**Whitman, Requardt and Smith** of Baltimore, Md., and Albany, N.Y., has been dissolved, and in its place are the firms of Whitman, Requardt and Associates of Baltimore and Whitman and Smith of Albany. Engineering commitments of the old firm are being continued by the new ones.

Partners in the Baltimore office are: Ezra B. Whitman, Richard F. Graef, Stewart F. Robertson, Roy H. Ritter, Gustav J. Requardt, Norman D. Kenney, A. Russell Vollmer, and Theodore W. Hacker. Their address is 1304 St. Paul St., Baltimore 2.

In Albany, Ezra B. Whitman and Benjamin L. Smith have formed a limited partnership and have offices at 11 North Pearl St., Albany 7.

**Marc B. Crowley** has been appointed New York District Mgr. of Sales for the American Well Works of Aurora, Ill. His district goes as far north as Albany and as far south as Trenton, N.J. Crowley has had many years of sales and engineering experience in connection with pumps and other machinery throughout the U.S. and South America.

(*Continued on page 44*)

No. 100 series meets all requirements of A. W. W. A. specifications and is tested and approved by Underwriters Bureau—it has seen over fifty years of use. Complete series for both public and private installations.

JOHN C. KUPFERLE FOUNDRY CO.
ST. LOUIS

*The name that speaks Volumes on the Water-front*

PEERLESS PUMP DIVISION, Food Machinery Corp.
301 W. Ave. 26, Los Angeles 31, Calif.
1250 W. Camden Ave., S. W., Canton 6, Ohio
Other Factories: San Jose 5, and Fresno 16, Calif.

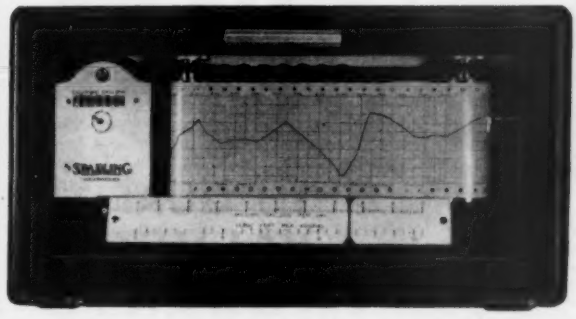
# SPARLING MAIN-LINE METERS

*The filtration and softening plant of the Metropolitan Water District of Southern California is equipped to handle 100 MGD and is designed to expand to 400 MGD. Sparling Meters measure the inflow from the Aqueduct to the plant, where Chlorination is controlled by the meters. Thirteen other Sparlings are used on wash-water lines and on the brine line in the zeolite regeneration process.*

## *Fifteen Gallons a Minute or Four Hundred Million a Day*

Accurate water production records make for economical operation in small plants as well as large ones. The cost of Sparling Meters is nothing compared to the necessary job they do.

For as little as $75 you can install a complete Totalizing unit on a 2-inch main line. A flanged Sparling Meter for a 6-inch line lists at $250. And some of the biggest water works jobs in the country are Sparling metered.



*A comprehensive line of Indicators, Recorders and Controls is available for use with Sparling Meters. There is one to suit your needs.*

*Bulletin 308 comes at your request.*

J. W. SPARLING *Manufacturer of Water Measuring Equipment*

LOS ANGELES 54, Box 3277, Terminal Annex 622 Broadway .....CINCINNATI 2
CHICAGO 16.....3104 South Michigan Ave. 101 Park Avenue.....NEW YORK 17
BOSTON 8.....6 Beacon Street

(*Continued from page 42*)

**David H. Caldwell,** formerly Dir. of the Research Lab., Bur. of San. Eng., Calif. State Dept. of Health, has returned to California from work with the Repairs and Utilities Branch of the 9th Service Command in Salt Lake City, Utah. He is now associated with the University of California at Berkeley.

**Alexander Rihm Jr.** has been commissioned 1st Lt. in the Sanitary Corps. From 1939 to 1942 he was a Jr. San. Engr. with the N.Y. State Health Dept. at Saranac Lake and from that time until he reported from duty was Dist. Engr. for the Dept. at Binghamton.

**The Annual Short Course in Water and Sewage Treatment,** sponsored by the Florida Sec., A.W.W.A., will be held in Daytona Beach on May 17–20. It is offered through the Gen. Extension Div. of the University of Florida, and co-operating in addition to the Florida Sec., A.W.W.A., groups are the Bur. of Eng. of the State Bd. of Health, the Florida Water Works Operators Assn., and the Florida Sewage Works Assn.

(*Continued on page 46*)

Corrosion's destructive work is on the *inside*. The *RUSTOP System of cathodic rust control* stops under-water corrosion *instantly, completely,* and *permanently* . . . in old tanks or new. No draining, sand blasting, or painting. No service interruptions . . . no taste. Operates for pennies per month. *Guaranteed.*

Write for full information.

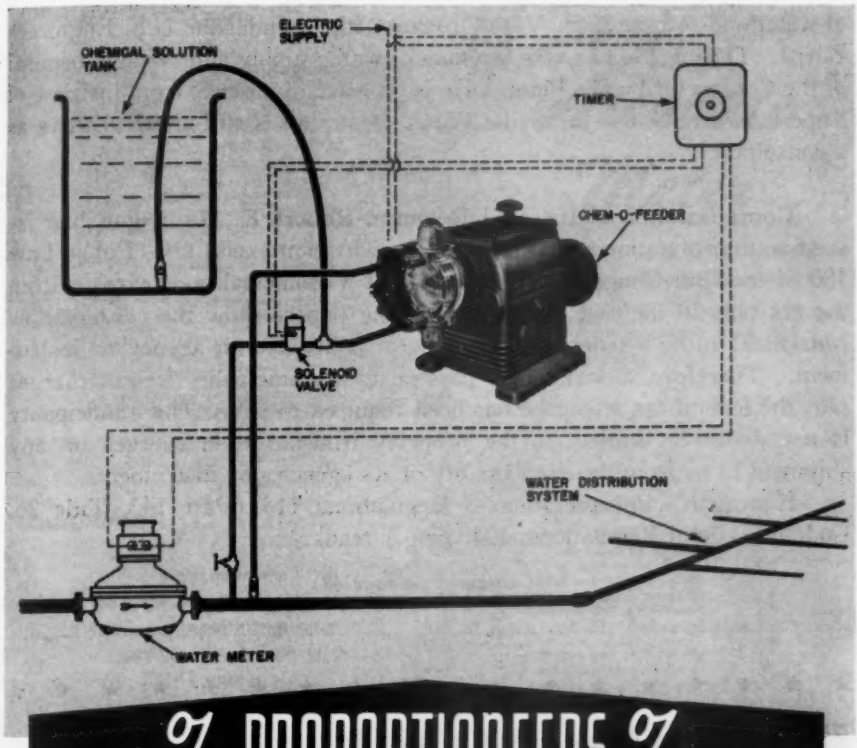
ELECTRO RUST-PROOFING CORP., Dayton 10, Ohio.

RUSTOP ELECTRO RUST-PROOFING CORPORATION

M H

HIGH QUALITY VALVES HYDRANTS

M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.




# %PROPORTIONEERS%
# RUST PREVENTION

Don't let corrosion sabotage pipes, valves or tanks! Scarcity of materials and labor today make rust prevention of particularly vital importance. When you are protecting the distribution system—the major portion of every water company's investment—it is not "smart gambling" even in ordinary times to take chances on under or over dosage of corrosion control chemical. With %Proportioneers% Heavy Duty Chem-O-Feeder as shown above there is no gamble on over or under dosage. The Chem-O-Feeder operates continuously but feeds only in proportion to flow through the water meter. By this method silicates, phosphates, etc., can be accurately fed directly into the pressure system. %Proportioneers% of different pressure or delivery capacity are available for this or other layouts. For immediate attention send details of your corrosion control problem to %Proportioneers, Inc.%

%PROPORTIONEERS, INC.%

"Chemical Feeder Headquarters"

61 CODDING ST., PROVIDENCE, R. I.

(*Continued from page 44*)

**W. A. Oeffler** of Jasonville, Ind., is Operating Engineer in charge of water and sewage at the Vigo Ordnance Plant, under the U.S. Engineers Corps. During 1943 he was foreman of water supply and sewage disposal of the Concan Ordnance Plant. He is on leave of absence from his post of Superintendent of the Jasonville Water Dept., but is still attached there as a consultant.

**Commissioner of Internal Revenue Robert E. Hannegan** has issued an interpretation of the federal transportation excise tax (Public Law 180 of the 78th Congress). He says that a municipality is exempt from the tax only in the case that "the shipping papers show the *consignor* or *consignee*" to be a federal, state, or local political unit, agency or instrument. Therefore, a dealer may pass on to a municipality freight charges plus the federal tax which he has been required to pay. The municipality is not, however, subject to the property transportation charges on any shipment to or from the municipality or its agencies or instruments.

Hannegan's interpretation of Regulations 113 (Part 143, Title 26, Code of Federal Regulations, 1943 Sup.) reads:

(*Continued on page 48*)

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**Back the Attack**
**WITH WAR BONDS**

***America's Most Popular Water Works Products***

**Activated Alum**

**Blackalum**

**Palmer Surface Wash Systems**

**(designed, fabricated, installed)**

**Write for details—no obligation.**

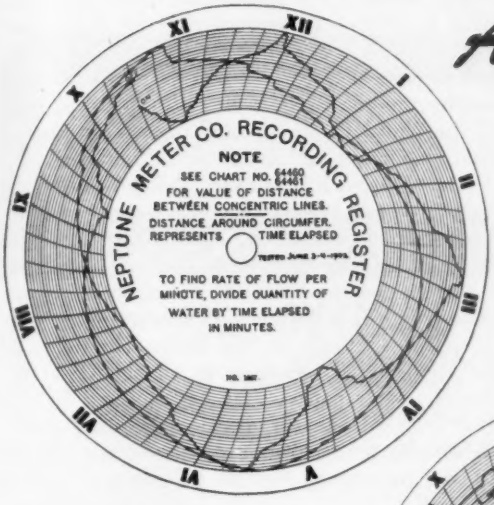
STUART-BRUMLEY CORP., 516 N. CHARLES ST., BALTIMORE-1, MD.

STUART—BRUMLEY

ACTIVATED ALUM • BLACKALUM • PALMER FILTER BED AGITATORS

## Demonstrating the Value of

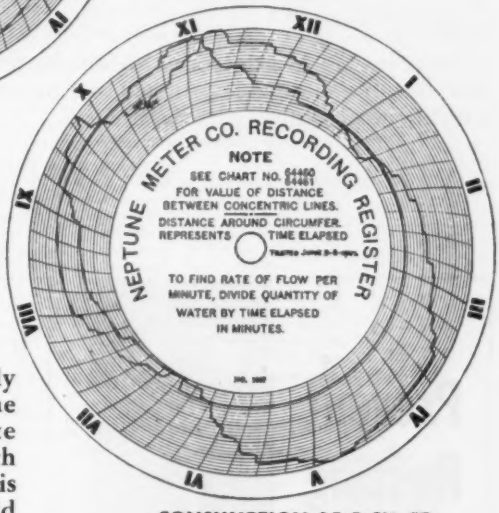
# *A Sensitive Accurate Meter....*


NEPTUNE METER CO. RECORDING REGISTER
NOTE
SEE CHART NO. 64460
64461
FOR VALUE OF DISTANCE
BETWEEN CONCENTRIC LINES.
DISTANCE AROUND CIRCUMFER.
REPRESENTS TIME ELAPSED
TO FIND RATE OF FLOW PER
MINUTE, DIVIDE QUANTITY OF
WATER BY TIME ELAPSED
IN MINUTES.
XI XII I II III AI A IA IIA VIII IX X

**CONSUMPTION 55.1 CU. FT.**

Chart at left is an actual record taken from a house with a toilet leak of about 1/15th gallon per minute, as registered by a sensitive, accurate meter.

Chart at right shows the result in the same house after this leak had been repaired—a drop in consumption, for a 24-hour period, of 149 gallons.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TO FIND RATE OF FLOW PER
MINUTE, DIVIDE QUANTITY OF
WATER BY TIME ELAPSED
IN MINUTES.
XI XII I II III AI A IA IIA VIII IX X

**CONSUMPTION 35.5 CU. FT.**

THIS comparison clearly demonstrates the value of a sensitive, accurate meter, as a meter which would not register at this low rate of flow would never have picked up the leak.

The Water Company would have lost the revenue on approximately 149 gallons per day or about 13,500 gallons per quarter.

Instead of 1/10th gallon per minute, leakage might have run as high as 1/3rd gallon per minute, with that much more loss to the Water Company.

## NEPTUNE METER COMPANY

**50 West 50th Street**
**New York 20, N. Y.**

Branch Offices in CHICAGO, SAN FRANCISCO, LOS ANGELES, PORTLAND, ORE., DENVER, DALLAS, KANSAS CITY, LOUISVILLE, ATLANTA, BOSTON

Neptune Meters, Ltd., Long Branch, Ont., Canada

92

(*Continued from page 46*)

Sec. 143.20. AMOUNTS PAID FOR TRANSPORTATION ORIGINATING PRIOR TO DECEMBER 1, 1943.—An amount paid for the transportation of property, where such transportation originated prior to December 1, 1943, is exempt from the tax (1) if paid directly to a carrier by the United States or any agency or instrumentality thereof, or by a State, or political subdivision thereof, or (2) if paid to the United States or any agency or instrumentality thereof. In either case an exemption certificate is not required.

Sec. 143.21. AMOUNTS PAID FOR TRANSPORTATION ORIGINATING ON OR AFTER DECEMBER 1, 1943.—An amount paid on or after December 1, 1943, for the transportation, originating on or after such date, of property to or from the Government of the United States, or any State, Territory, or political subdivision thereof, or the District of Columbia, is exempt from the tax. Where the shipping papers show the consignor or consignee to be the Government of the United States, or any State, Territory, or political subdivision thereof, or the District of Columbia, or an agency or instrumentality of any of the foregoing, such papers may be accepted by the carrier as proof of the exempt character of the shipment. A United States Government bill of lading may likewise be accepted as evidence of the exempt character of the shipment. In any case covered by the two preceding sentences a certificate of exemption is not required.

(*Continued on page 50*)

**Prevent Rusting**

**Rusta Restor** cathodic protection, provides *permanent protection* against rusting of water tanks, piping and steel structures of all kinds.

Initial cost of a complete equipment is about equal to the cost of a good paint job. . . . Operation costs only about 2 mills (i. e. $0.002) per year per square foot of surface protected.

If your tanks and steel structures are not now protected by this proven low-cost method, they should be. No obligation. Send for fully descriptive literature today.

**RUSTA RESTOR**
Division of
THE JOHNSTON & JENNINGS CO.
862 Addison Road Cleveland, Ohio

**NEW LaMOTTE H-C CHLORINE COMPARATOR**

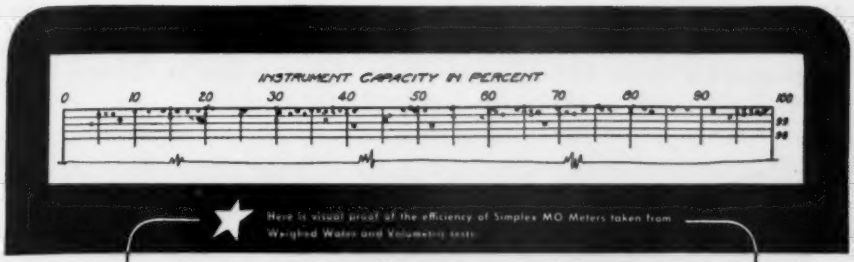
*(For High Chlorine Concentrations— 1.0 to 200 ppm. and above)*

A special Chlorine Unit designed for uses where a high residual of 1.0 ppm. or more of chlorine is maintained. Price, complete with instructions, $12.50.

The H-C Chlorine Comparator is one of a complete new line of LaMotte Chlorine Units. Embodies latest approved developments such as control of color development, pH, etc., along with a new series of interchangeable 15 mm. chlorine color standards embracing the entire useful range. The new LaMotte o-Tolidine reagent is used with all LaMotte units, and may be purchased separately, in various package sizes. Write for descriptive booklet.

LaMOTTE CHEMICAL PRODUCTS CO.
Dept. AWA
Towson-4, Baltimore, Md.

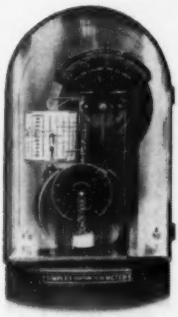
1919 · 25TH ANNIVERSARY · 1944




Here is visual proof of the efficiency of Simplex MO Meters taken from Weighed Water and Volumetric tests.

# *The* OVERALL ACCURACY of the SIMPLEX MO METER

## AS SHOWN BY WEIGHED WATER and VOLUMETRIC TESTS



The matter of final concern to the user of a flow rate meter is the overall efficiency of the instrument — whether its purpose is to indicate, record, or totalize the flow.

The efficiency of sixteen Simplex MO Meters when tested in place by weighing scales and checked by the volume of standpipes is here illustrated. The data was taken at random from routine records of wide-range tests conducted by the laboratory of Simplex Valve & Meter Co. These accuracies speak for themselves.

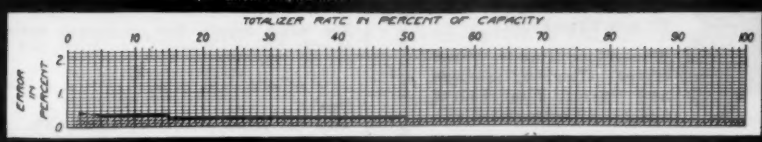
In addition to its inherent accuracy, the Simplex MO Meter operates on a simple trouble-free principle which assures extreme sensitivity over the entire meter range. An applied differential head of 1/6 inch of water or less is sufficient to cause functional operation of this instrument. Any change in the rate of flow through a primary device is instantaneously and accurately recorded on the Simplex Meter Chart.

In the unique totalizer design, a frictionless vertical movement of the assembly occurs with flow changes. Constant speed revolution of a friction disc through the variable horizontal speed of a traction roller integrates the rate of flow. The result is highly dependable, accurate totalization of flows over the entire range of the instrument.

Investigate the exceptional values of the Simplex MO Meter. Write today for Bulletin 300.

**SIMPLEX VALVE & METER CO.**
**C784 UPLAND STREET, PHILA. 42, PA.**

An error curve showing totalizer rate in percent of capacity against actual weighed water.



(*Continued from page 48*)

**Military, Lend-Lease and essential civilian demand** for heavy construction machinery is expected to increase, and this places upon all owners of used construction machinery the patriotic duty of selling their idle equipment, Henry M. Hale, Dir. of W.P.B. Construction Machinery Div., stated on February 14 in Release No. WPB–LD–347.

"Since 90 per cent of all new equipment is now needed overseas, the bulk of essential construction work at home is being carried on with used equipment," Hale says. "Practically all new equipment as well as some used equipment will without doubt be required overseas as military operations expand and additional territory is reclaimed from the Axis. This means that we cannot afford the luxury of idle equipment, stored away and waiting for peacetime work. Cranes, shovels, motor graders and tractors are especially needed."

Some reluctance in selling used equipment will be overcome through a full understanding of tax relief provisions applicable to profits from the sale of used machinery. These provisions, under specified conditions, cover both voluntary sales and sales made under "the threat or imminence of requisition" to a government agency having power to requisition.

(*Continued on page 52*)

**Vogt Fire Hydrants**

Standard—
"Traffic Model"—
Flush Type—
Water Crane—
Type

**Vogt Gate Valves**

Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit any Type Pipe.

Also—Floor Stands, Shear Gates—Tapping Sleeves and Valves, Flap Valves and Mud Valves.

**Vogt Brothers Mfg. Co.**
INCORPORATED
MAIN AT 14th ST.
LOUISVILLE KENTUCKY

**3** *Money, Time and Labor Saving Features of*

**UNIVERSAL**
**CAST IRON PIPE**

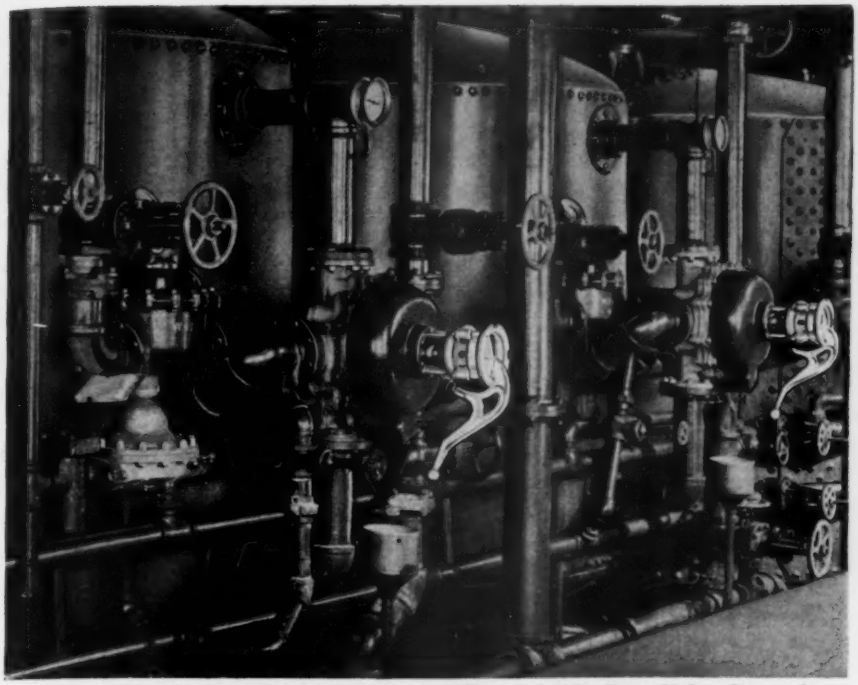
LAID WITH ONLY WRENCHES →
NO CAULKING MATERIALS →
NO GASKETS. NO BELL HOLES TO DIG. →

For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.

*Dept. C*
THE CENTRAL FOUNDRY COMPANY
386 FOURTH AVENUE, NEW YORK 16, N. Y.

Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.

NAME _____
STREET _____
CITY _____



A Battery of Refinite Softeners equipped with Multi-Port Valve Controls

*Get the Facts NOW for the Future!*

**SOFT WATER IS IMPORTANT**

**IN YOUR CITY'S POST WAR PLANS . . . .**

**Soft water can mean so much toward the happiness and comfort of the citizens of your community. No post war plans are complete without plans for soft, iron-free water. The groundwork for a softener installation can be laid now by calling in Refinite engineers and technical experts. Quotations and unbiased recommendations will be made without obligation. Get the facts NOW about Refinite water conditioning equipment.**

***The Refinite Corporation***

**Write for Free Catalog** **108 Refinite Bldg., Omaha, Nebraska**

(*Continued from page 50*)

Additional information on these tax relief provisions should be obtained from any collector of internal revenue or from a tax consultant.

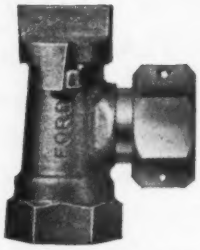
**The Los Angeles Dept. of Water & Power** was operated by the U. S. Army during the last week in February, the first municipal utility to be federally operated since the war began.

Members of the International Brotherhood of Electrical Workers, AFL, were on strike for wage increases when the West Coast was hit by a severe wind and rain storm on February 19, resulting in widespread damage and power failure. Several days later the Army stepped in, and though Col. Rufus W. Putnam was put in charge, H. A. Van Norman, Gen. Mgr., continued in charge of operations.

The Army's chief activity was as conciliator in the strike, although it did not meet officially with either disputant. The strike had been called after the utility had agreed to wage increases of $\frac{1}{3}$ of the union's demands. Although the strikers are now back at work, the question has not been settled. There is not now any government agency legally designated to settle municipal department disputes.

(*Continued on page 54*)

Ringstyle



The Ford RINGSTYLE Valve is an inverted key angle valve with meter coupling nut attached. For pit settings where meter is set on risers it makes a most convenient and satisfactory curb valve. Hundreds of thousands in service. Write for catalog and further information.

FORD METER BOX CO.,
WABASH, IND.

BUILDERS
WATER AND SEWAGE WORKS
Equipment

VENTURI METERS
*Bulletin 293B*
TYPE M and FLO-WATCH INSTRUMENTS
*Bulletins 324 and 318A*
VENTURI EFFLUENT CONTROLLERS
*Bulletin 321A*
FILTER GAUGES
*Bulletin 329*
LIQUID LEVEL GAUGES
*Bulletins 326 and 329*
SAND EXPANSION GAUGES
*Bulletin 335*
KENNISON OPEN FLOW NOZZLES
*Bulletin 334A*
CHRONOFLO TELEMETERS and CONTROLLERS
*Bulletin 320A*
TOLEDO-CHRONOFLO CONVEYOR SCALES
*Bulletin 322*

*The above bulletins are available to you.*
*Builders-Providence, Inc.,*
*(division of Builders Iron Foundry)*
*9 Codding St., Providence 1, R. I.*

"BLUE PRINT NOW"

*Sincerely Yours,*
BUILDERS-PROVIDENCE

# IMPORTANT

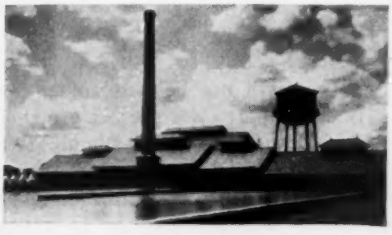
## Public Health must be maintained!

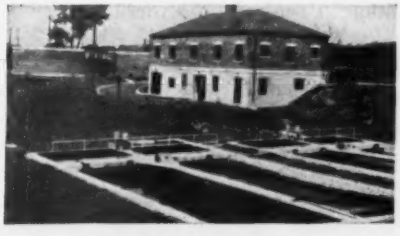
The necessity of maintaining public health in war time is self-evident. Municipal officers in charge of water purification and sewage disposal have a vital responsibility in guarding the nation's health, that should not be underestimated as a contributing factor to final victory.

However, the problems of maintaining public health are *becoming increasingly difficult in the face of material shortages and transportation handicaps.* In order to ease this situation in regard to *Aluminum Sulfate* as much as possible, won't you place your orders as far ahead as you can so that we may schedule our production on an efficient basis.

### Why Most American Cities Prefer General Chemical Aluminum Sulfate

General Chemical Aluminum Sulfate is an especially developed "Alum." High quality and constant uniformity have given it *a time-tested* reputation among water works engineers and sewage plant operators.





★ **FOR WATER WORKS**

1. Makes water crystal clear.
2. Longer filter runs are obtainable.
3. Is economical, used properly will conserve chlorine supplies . . . because it does not require oxidation to make it effective.
4. Superior in tests against other coagulants.
5. High in quality, its constant uniformity can be counted upon.

★ **FOR SEWAGE PLANTS**

1. Clean, easy to handle and economical to use.
2. Simple application, requires only low cost feeding apparatus and minimum attention.
3. Clear, colorless effluents are possible.
4. Precipitated sludge digests readily.
5. Treated digested sludge dries quickly, without odor.

**GENERAL CHEMICAL COMPANY**

**40 RECTOR STREET, NEW YORK 6, N. Y.**

*Technical Service Offices:* Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh Providence (R. I.) • St. Louis • Utica (N. Y.)

*Pacific Coast Technical Service Offices:*

Los Angeles • San Francisco • Seattle, Wenatchee and Yakima (Wash.)

**In Canada: The Nichols Chemical Co., Ltd. • Montreal • Toronto • Vancouver**

*PREVENT WEAR AND CUTTING of rods, plungers and shafts by using*

MABBS

**MABBS RAWHIDE PACKING**

**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**

(*Continued from page 52*)

**The Stream Pollution Investigation Station,** U.S. Public Health Service, Cincinnati, has shown that chlorination and bromination may be the answer to the problem of disposal of wastes from dynamite plants. The high color of the waste due to soluble nitrotoluene sulfonic acids is difficult to counteract by dilution unless it is emptied into a very large stream, the station says, and investigation has shown that the standard chemical methods of treating dilute industrial wastes, such as neutralization, chemical precipitation, fractionation, extraction, ozonation, and electrolytic reduction, are of no or slight usefulness. Chlorination and bromination were the only methods which hold promise of success.

**"If engineers will consider the ability to speak and write** as important as the legal profession considers it," Edward R. Stapley, Acting Dean of Eng., Oklahoma A. and M. College, Stillwater, Okla., wrote recently in the college magazine there, "then the engineering profession will stage a real advancement."

Dean Stapley adds:

Any employer of engineers in large numbers will not hesitate to tell you that the ability to write a clear, logical and concise report on a project proposed, or on work in process or already completed, is fully as essential as the ability to perform the technical steps involved. In fact, if the preliminary report is not satisfactory or acceptable the project may never get to the design or construction stage. If the engineer cannot stand on his feet and explain to a non-technical group in simple and understandable language the merits of a particular project, it is very unlikely that he will obtain the interest or backing of its members.

For the engineer already graduated it is suggested that he avail himself of every opportunity to improve his oral and written expression. Writing technical and semi-technical articles for magazines and newspapers, presenting papers at technical meetings and entering into the discussions, speaking before club and church groups of whatever size whenever the opportunity offers, will increase both his confidence and his ability.

COOK Well Strainers

**A reciprocal relation, the life and functioning of the one depending much on the other.**

**A. D. COOK, INC.**

**Lawrenceburg - Indiana**

COOK Deep-Well Turbine Pumps

# NEWS OF THE FIELD

**When the American Water Works Association** held its First Annual Convention in March 1881, it adopted a constitution which provided for the admission of "Honorary Members" who were defined as "persons or firms engaged in furnishing material for the construction and maintenance of water works." By that definition, the oldest "Honorary Members" of the Association still holding memberships are these present-day Associate Members who joined in 1882: the Bingham & Taylor Corp., Buffalo, N.Y.; the Hays Mfg. Co., Erie, Pa.; the Ludlow Mfg. Co., Troy, N.Y.; the Mueller Co., Decatur, Ill.; and the National Meter Co., Brooklyn, N.Y. (Pittsburgh-National Meter Co.).

At the Third Annual Convention, in May 1883, the Constitution was amended so that the Honorary Members became Associates, and a new class of Honorary Members was established. The latter were defined as "persons interested in subjects relating to water supply, but not eligible to membership" (i.e. neither designers or operators of water works nor water works manufacturers). They paid no dues and could not vote. Honorary Members today, as mentioned in the April JOURNAL, are now elected for their services or pre-eminence in the water works field and enjoy the privileges of Active Members.

Advertising pages in the first volume of *The Proceedings of the American Water Works Association* (1881–1886) carry the sales messages of these present-day JOURNAL advertisers: James B. Clow & Son, Chicago, who announced that "we furnish every article required in the construction of Water Works" and that they carried "A full Stock of every variety of Plumber's Supplies"; H. Mueller & Sons, Decatur, Ill., who "have the most encouraging reports from our WATER PRESSURE REGULATOR"; R. D. Wood & Co., who, besides being manufacturers of cast-iron pipe, hydrants, valves, and other items, also did "Sugar House Work" (a sugar house, says *Webster's,* is a shed where maple sugar and syrup are made); and Henry R. Worthington, New York, who simply displayed a steel engraving of his "Worthington High-Duty Pumping Engine."

Associate Members who have completed 30 or more uninterrupted years' membership in the A.W.W.A. are here listed alphabetically. There are other companies now belonging to the Association who belonged in the early days, or whose predecessor organizations belonged, but whose membership has not been continuous.

(*Continued on page 2*)

(*Continued from page 1*)

Allis-Chalmers Mfg. Co., *'05*
Milwaukee, Wis.

American Cast Iron Pipe Co., *'07*
Birmingham, Ala.

American Cyanamid & Chemical Corp., *'06*
New York, N.Y.

American Foundry & Mfg. Co., *'08*
St. Louis, Mo.

Bingham & Taylor Corp., *'82*
Buffalo, N.Y.

Bourbon Copper & Brass Works Co., *'84*
Cincinnati, Ohio

Buffalo Meter Co., *'05*
Buffalo, N.Y.

Builders-Providence, Inc., *'01*
Providence, R.I.

Central Foundry Co., *'03*
New York, N.Y.

Chapman Valve Mfg. Co., *'84*
Indian Orchard, Mass.

Chicago Bridge & Iron Co., *'08*
Chicago, Ill.

H. W. Clark Co., *'08*
Mattoon, Ill.

James B. Clow & Sons, *'85*
Chicago, Ill.

A. D. Cook, Inc., *'14*
Lawrenceburg, Ind.

Darling Valve & Mfg. Co., *'08*
Williamsport, Pa.

Dresser Mfg. Co., *'04*
Bradford, Pa.

Eddy Valve Co., *'86*
Waterford, N.Y.

Farnan Brass Works Co., *'92*
Cleveland, Ohio

Ford Meter Box Co., *'08*
Haddonfield, N.J.

General Chemical Co., *'02*
Chicago, Ill.

Glamorgan Pipe & Foundry Co., *'07*
Lynchburg, Va.

Hays Mfg. Co., *'82*
Erie, Pa.

Hersey Mfg. Co., *'87*
South Boston, Mass.

Kennedy Valve Mfg. Co., *'11*
Elmira, N.Y.

Leadite Co., Inc., *'10*
Philadelphia, Pa.

Ludlow Valve Mfg. Co., *'82*
Troy, N.Y.

Mueller Co., *'82*
Decatur, Ill.

National Meter Div., Pittsburgh Equitable Meter Co., *'82*
Brooklyn, N.Y.

National Water Main Cleaning Co., *'06*
New York, N.Y.

Neptune Meter Co., *'04*
New York, N.Y.

Niagara Alkali Co., *'13*
New York, N.Y.

Pennsylvania Salt Mfg. Co., *'03*
Philadelphia, Pa.

The Permutit Co., *'14*
New York, N.Y.

The Pitometer Co., *'06*
New York, N.Y.

Pittsburgh Equitable Meter Co., *'98*
Pittsburgh, Pa.

Pittsburgh-Des Moines Steel Co., *'14*
Pittsburgh, Pa.

Rensselaer Valve Co., *'90*
Troy, N.Y.

(*Continued on page 4*)

**PIPE ACCORDING TO THE A. S. A. LAW OF DESIGN**

Mono-Cast Centrifugal Pipe can be manufactured in specific weights for specific laying conditions, and in accordance with the recently adopted A. S. A. Law of Design. You get the *exact* pipe your conditions call for.

**PROMPT DELIVERIES with suitable priorities**

**AMERICAN CAST IRON PIPE COMPANY**

**BIRMINGHAM 2, ALABAMA**

*Sales Offices in Principal Cities*

*The name that speaks Volumes on the Water-front*

**PEERLESS PUMP DIVISION, Food Machinery Corp.**
**301 W. Ave. 26, Los Angeles 31, Calif.**
**1250 W. Camden Ave., S. W., Canton 6, Ohio**
**Other Factories: San Jose 5, and Fresno 16, Calif.**

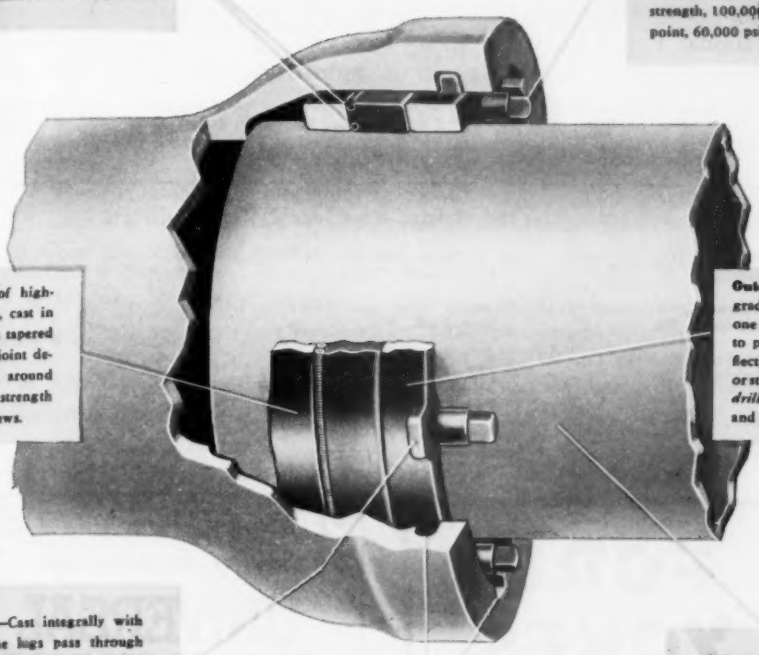
# n INSIDE View of the RESSER BELLMASTER

## The Tight CIP Joint that Fits Inside the Bell

### CUTAWAY VIEW
**Style 85—Dresser Bellmaster Joint**

**…sets**—Plain or Armored type …sets are available, depending on … contents. When ordering, specify …vice. Gaskets are ¾" x 1 7/16" in …s-section and are of scientifically …ared, resilient rubber compound.

**Capscrews**—Cold-upset from special steel and heat-treated for maximum strength. Double-headed: square section for wrenching, and large round section for extra protection against corrosion. Minimum ultimate tensile strength, 100,000 psi. Minimum yield point, 60,000 psi.



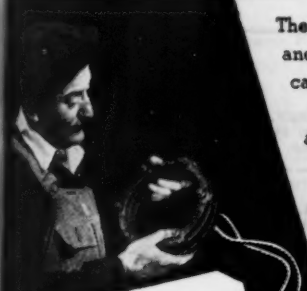
**…g**—Made of high-…leable iron, cast in … Outside is tapered … maximum joint de-…tra metal around …w holes for strength …ion of screws.

**Outer Ring**—Made of high-grade malleable iron, cast in one piece. Tapered on outside to permit maximum joint deflection without metal bending or stressing. Extra metal around *drilled* screw holes for strength and protection of screws.

**…king Lugs**—Cast integrally with …r ring. The lugs pass through …ots" in the bell face when the Joint …mbled. The Joint is then turned …ckwise until one lug hits the stop …bell groove, preventing rotation of …nt while capscrews are tightened.

**Bell End of Pipe**—Inner circumference is grooved to accommodate locking lugs. Slots on face of bell permit lug passage. When ordering, simply specify "Bellmaster Pipe."

**Spigot End of Pipe**—Absolutely plain. No bead, lip, or other special shape required.



…ped, Stored, Installed
All In One Piece

The Dresser Bellmaster Joint, Style 85, makes cast-iron pipe joining faster and easier than ever before. Light, compact, all-in-one-piece, this mechanical joint is locked into place and tightened—in from 2 to 5 minutes' time.

Compression of the resilient rubber-type gasket between two metal rings and against the pipe by cap screws, effects a flexible seal that stays tight even under severe conditions of expansion, contraction, deflection and vibration. Your cast-iron lines are thus protected from breakage and leakage. They may be laid above the ditch and safely lowered in place.

The Bellmaster fits *inside* the bell. It is completely enclosed—no exposed parts to chip, break or corrode. Bellmaster pipe can be readily obtained from your regular source of supply. And we are able to ship joints promptly. Sizes 3", 4", 6", 8" 10", 12", 16" CIP. *Catalog 395 AM on request.*

*In Canada: Dresser Manufacturing Co., Ltd., 60 Front St., West, Toronto, Ont.*

**DRESSER** MANUFACTURING COMPANY • BRADFORD, PA.

ONE OF THE DRESSER INDUSTRIES

**Clarence M. Baker,** 61, Consulting Engineer, Madison, Wis., died in February of a heart attack.

Mr. Baker, who was born in Ithaca, N.Y., and graduated from Cornell University, served as a Captain in the U.S. Public Health Service during World War I. He went to Madison in 1919 to join the State Board of Health there, and served it for 8 years as Sanitary Engineer. He then joined the American Paper and Pulp Assn. and National Paper Board Assn. as Engineer. In his subsequent consulting practice, he specialized in industrial waste utilization and stream pollution problems.

Mr. Baker became a member of the A.W.W.A. in 1915.

(*Continued from page 2*)

Roberts Filter Mfg. Co., *'10*
Philadelphia, Pa.

Ross Valve Mfg. Co., Inc., *'91*
Philadelphia, Pa.

Simplex Valve & Meter Co., *'14*
Philadelphia, Pa.

A. P. Smith Mfg. Co., *'97*
East Orange, N.J.

Thomson Meter Co., *'91*
New York, N.Y.

U.S. Pipe & Foundry Co., *'92*
Philadelphia, Pa.

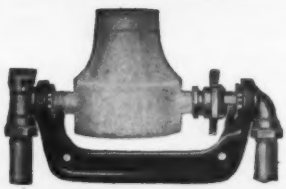
Warren Fdry & Pipe Corp., *'11*
New York, N.Y.

R. D. Wood Co., *'84*
Philadelphia, Pa.

Worthington Pump & Machinery Corp., *'84*
Harrison, N.J.

(*Continued on page 6*)

FORD YOKES



*With the trend more strongly than ever toward greater accuracy and more frequent testing, the easy and trouble-free accessibility of a water meter set in a Ford Yoke makes this proven and perfected setting device most worth while.*

**Catalog sent for the asking.**

FORD METER BOX CO.,
WABASH, IND.

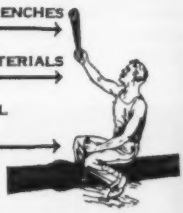
3 *Money, Time and Labor Saving Features of*

UNIVERSAL CAST IRON PIPE

LAID WITH ONLY WRENCHES

NO CAULKING MATERIALS

NO GASKETS. NO BELL HOLES TO DIG.



**For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.**

*Dept. C*
**THE CENTRAL FOUNDRY COMPANY**
**386 FOURTH AVENUE, NEW YORK 16, N. Y.**

**Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.**

**NAME** _____

**STREET** _____

**CITY** _____

● Topeka, Kansas—Modern Water Softening Plant Using Dorr Equipment

# WATER TREATMENT FOR ALL PURPOSES

● The experience of The Dorr Company for over 30 years has covered water treatment for large and small municipal and industrial uses comprising any or all of the following operations—

| | | |
|---|---|---|
| **Mud & Silt Removal** | **Softening** | **Iron & Manganese Removal** |
| **Color Removal** | **Clarification** | **De-Ionization** |

● All of these steps are performed mechanically and continuously in well designed Dorr equipment:

● **Dorrco Flash Mixer**—For instantaneously diffusing coagulating or softening chemicals.

● **Dorrco Flocculator**—Slowly rotating paddles for building up large quickly settling flocs.

● **Dorr Clarifiers**—For large or small—round or square sedimentation units.

● **Dorrco Clariflocculator**—A combined Flocculator and Clarifier in a single tank.

● **Dorrco Hydro-Treator**—A high capacity coagulation or softening upward flow unit.

● **D-I System**—For partial or complete deionization of water.

● **Barnes-Dorrco Pump**—Especially designed plunger pump with varying capacity for removing sludges.

● Dorr Engineers give each water problem a thorough study before making recommendations. An inquiry to our nearest office will bring to you complete information on any phase of water treatment.

DORR

RESEARCH—ENGINEERING—EQUIPMENT

ADDRESS ALL INQUIRIES TO OUR NEAREST OFFICE

DORRCO

THE DORR COMPANY, ENGINEERS

NEW YORK 22, N. Y. . . . 570 Lexington Ave. CHICAGO 1, ILL. . . . 221 No. LaSalle St.
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TORONTO 2, ONT. . . . 80 Richmond St. W. LOS ANGELES 14, CAL. . . . 811 West 7th St.

RESEARCH AND TESTING LABORATORIES . . . . . WESTPORT, CONN.

SUGAR PROCESSING: PETREE & DORR DIVISION, 570 LEXINGTON AVENUE, NEW YORK 22

(*Continued from page 4*)

**Henry T. Gidley,** for 31 years Superintendent of the Fairhaven, Mass., Water Co., died suddenly of a heart attack on March 3 at the age of 65.

Mr. Gidley studied at the Massachusetts Institute of Technology and was a civil engineer in Boston before going to Fairhaven. While in private practice he supervised the construction of the water works at Amherst and at Brookfield. In 1910 he worked on the Boston-to-Key West Canal.

Mr. Gidley joined the A.W.W.A. in 1923.

**William C. Mabee** retired from his post as Chief Engineer of the Indianapolis Water Co. on April 1, after 42 years of continuous service.

Mabee joined the company in 1902 as a supervisor of construction work. In the early days, he worked on the Davis Building at the Riverside Pumping Station, the sedimentation basin and slow sand filters at the White River Purification Plant, the concrete aqueduct that replaced one

(*Continued on page 8*)

*Send Us Your Orders Now!*

**Although a large part of our facilities is being used to produce war materials for our armed forces, we are able to manufacture a complete line of Water Works Products. We suggest that you make a seasonal check-up of your Water Works requirements and let us have your orders now. We want to be in a position to fill your needs with *enough* and on *time*.**

*The Water Works Convention is always a matter of pleasant anticipation to us. We look forward to seeing old friends, renewing acquaintances and talking over mutual interests in an atmosphere of good fellowship. Meet us in Milwaukee in June. We'll be happy to see you.*

***BACK THE ATTACK—BUY MORE WAR BONDS***

OUR SEVENTY-FIFTH ANNIVERSARY

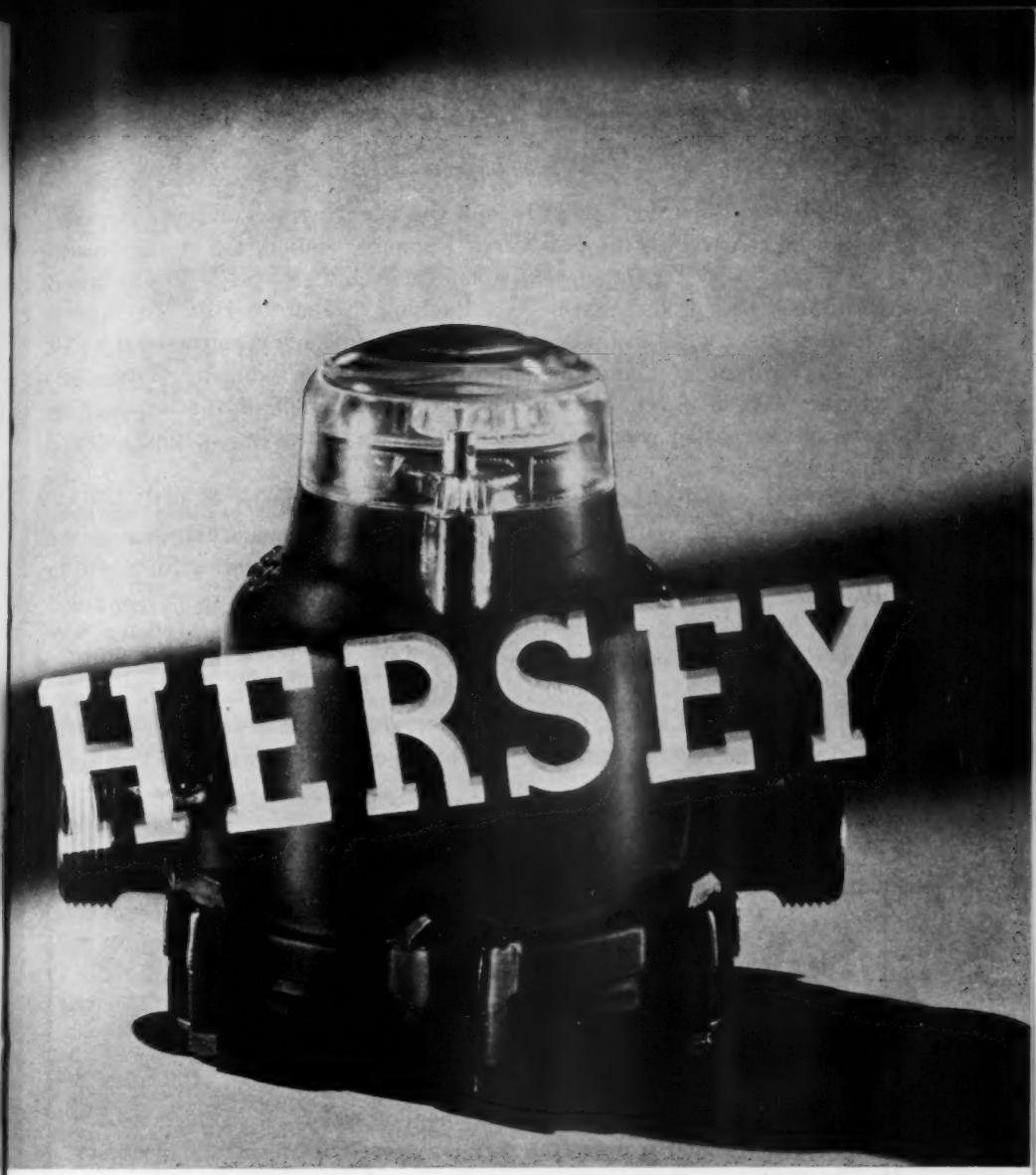
**HAYS MANUFACTURING CO • ERIE • PA.**

WATER WORKS PRODUCTS

HAYS

(SINCE 1869)

★ Invest in Bonds today to provide for extensions tomorrow ★ ★ ★




**A name and a water meter that have been truly dependable for more than half a century. That is why experienced Water Works officials standardize on**

**HERSEY WATER METERS**

• • •

**HERSEY MANUFACTURING COMPANY**

**SOUTH BOSTON, MASS.**

**BRANCH OFFICES:**

NEW YORK — PORTLAND, ORE. — PHILADELPHIA — ATLANTA — DALLAS — CHICAGO — SAN FRANCISCO — LOS ANGELES

(*Continued from page 6*)

washed away by a flood in 1904, and the storage reservoirs at Riverside. Later, he constructed the Fall Creek Pumping Station, the storage reservoirs there, and the rapid sand filters at White River. He supervised the remodeling of the Washington Pumping Station and the erection of elevated water tanks in Irvington and Blue Ridge, and constructed the Fall Creek Purification Plant and improvements to the pumping station adjacent. His final achievement was the construction of the impounding reservoir on Fall Creek, northeast of the city, which was completed and filled last year.

Mabee was made Assistant Engineer of the company in 1917 and became Chief Engineer in 1928. In 1933 he served as Chairman of the Indiana Section, A.W.W.A., and was an Association Director for the term 1936–37. The Diven Memorial Medal for outstanding work was awarded to him by the Association in 1938, and in the same year the Indiana Section chose him as recipient of the Fuller Award.

**Maj. Harry Larson, C.E.,** is now serving in the European Theatre, from where he reports that he is "in charge of a public works section for a

(*Continued on page 10*)


# SAVE FOR VICTORY

**EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.**

***Now is the time to do your part—SAVE FOR VICTORY***

## National Water Main Cleaning Co.

**30 Church St., New York, N. Y.**

**BRANCHES**

**115 Peterboro St., Boston, Mass.**
**910 William Oliver Bldg., Atlanta, Ga.**
**7103 Dale Ave., St. Louis, Mo.**
**576 Wall St., Winnipeg, Man., Canada**
**3812 Castellar St., Omaha, Neb.**
**205 West Wacker Drive, Chicago, Ill.**
**501 Howard St., San Francisco, Calif.**
**2028 Union Ave., Montreal, Canada**
**P. O. Box 683, Jacksonville, Fla.**

*Clow-National*

# CAST IRON PIPE AND FITTINGS

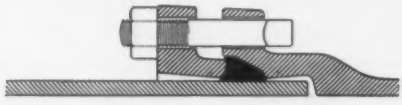
## CAN BE FURNISHED TO MEET THE REQUIREMENTS OF ALL EXISTING SPECIFICATIONS

**SUPER-deLAVAUD CENTRIFUGALLY CAST**

The standard water bell is the most common type of cast iron pipe joint—popularly known as the "bell and spigot" joint. Available in sizes 3 to 24 inches inclusive, in 12 and 18-foot lengths, and for working pressures up to 250 pounds.

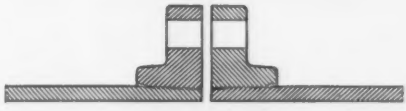
**Standard Water Bell**

A time-saving, easily installed mechanical joint cast iron pipe now used extensively. Made in all sizes from 3 inches through 24 inches, in 18-foot lengths, and for pressures up to 250 pounds.



**"C-N" Mechanical Joint**

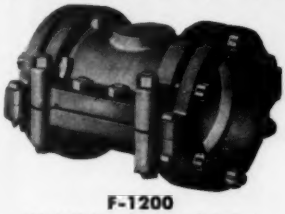
Cast iron flanged pipe is widely used for exposed pipe line work, inside and outside of buildings, for conducting water, steam, gas, oil and other fluids. Comes in same sizes and for same pressures as listed above, and in 12 and 18-foot lengths.



**Flanged Joint**

## "C-N" MECHANICAL JOINT SPLIT REPAIR SLEEVE

**NO LEADING OR CALKING—ONLY A RATCHET WRENCH NEEDED**



**F-1200**
**"C-N" Mechanical Joint**
**Split Sleeve**

WHEN IT'S NEEDED, YOU'LL WANT IT ON HAND. Be ready to restore service in your water distribution system with a minimum of "shut-down" time for repairing any damage that may occur to an underground main—damage due to freezing, to water hammer or to external shock. Stock a few of our F-1200 "C-N" split repair sleeves in sizes to match the sizes of water main you have buried under your streets. Your men are helpless to make quick repairs in an emergency without the necessary tools and "repair specials" on hand. Be prepared.

***See page 87 of catalog PIPE ECONOMY for complete detailed information***

## JAMES B. CLOW & SONS

**201-299 N. Talman Avenue** (P. O. Box 6600 A) **CHICAGO 80, ILLINOIS**

**NATIONAL CAST IRON PIPE**

(A Division of James B. Clow & Sons)

**BIRMINGHAM 2, ALA.**

*Everything for the municipal water supply system*

(*Continued from page 8*)

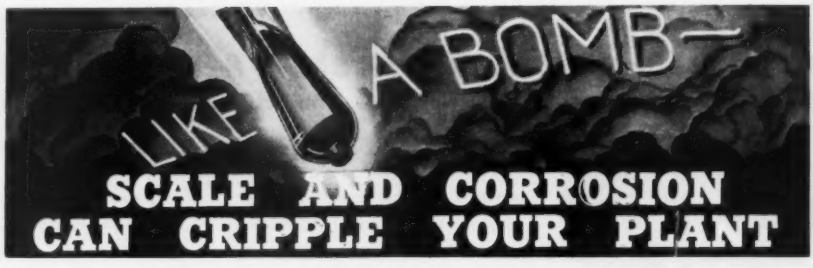
city of considerable size." He has "general supervision of the rehabilitation and reconstruction of various utilities such as streets, sewers and water supply. Civilian labor is used to a great extent to do this work under the supervision of military personnel."

Maj. Larson was a consulting engineer in civilian life, and specialized in investigation, design and preparation of reports on flood control activities. He also did research in hydraulics, and was engaged on various construction projects.

**Maj. Lloyd K. Clark, S.C.,** former Dir. of the Div. of San. Eng., North Dakota State Dept. of Health, is now engaged in duties involving water supplies, sewage and waste disposal in the Southwest Pacific Area. A reservist since 1930, he was called up in March 1941, has served in the Headquarters of the 7th Service Command, Omaha, Neb., and was for two years in the San. Eng. Div. of the Surgeon General's Office, Washington, D.C. He went overseas in October 1943.

In a recent V–Mail communication to the A.W.W.A., Maj. Clark observed: "If precipitation is any indication, there are many prospective members out here. How about a Southwest Pacific Section?"

(*Continued on page 12*)




**SCALE AND CORROSION CAN CRIPPLE YOUR PLANT**

Your plant is being attacked today, tonight, every day by a destructive force. Scale and corrosion are enemies to your piping system, boilers and condensers. So secretive is their work that before you realize it your plant efficiency is reduced and your production slowed up.

Call in a Haering engineer today without obligation. He will show you how Haering Glucosates save you money and increase production. He will prove to you that Haering Glucosates correct these conditions definitely and protect your equipment against scale and corrosion.

***Write for these booklets . . .***

**"Organic Methods of Scale and Corrosion Control"**
**"H-O-H Lighthouse"**

**D. W. HAERING & CO., Inc.**
GENERAL OFFICES
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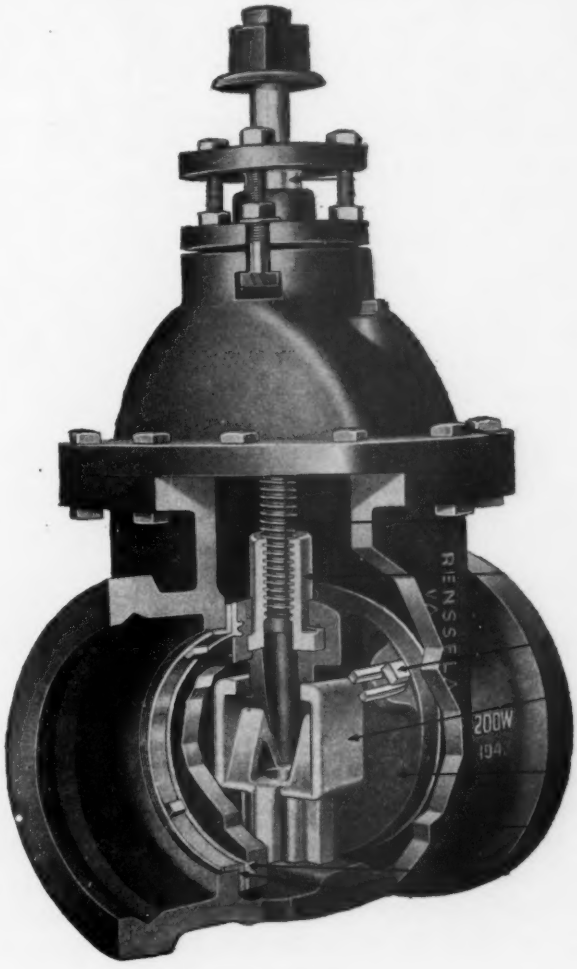
WE READ WATER




*In a Gate Valve, too, "it's what is inside that counts."*

**THERE HAS NEVER BEEN DEVELOPED AN EFFECTIVE SUBSTITUTE FOR GOOD MATERIAL AND WORKMANSHIP BACKED BY SOUND DESIGN**

*"Ask the man who uses RENSSELAER"*

**RENSSELAER VALVE CO., TROY, N. Y.**

COOK Well Strainers

A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.

Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 10*)

**John R. Thoman,** formerly of Columbus, Ohio, has been commissioned Assistant Sanitary Engineer (R) in the U.S. Public Health Service, and assigned to the Atlanta, Ga., office of the Typhus Control Unit.

**John E. Miller,** former Asst. Engr., Michigan State Dept. of Health, is now Service Engr. in the Buildings and Construction Division of the State Administrative Board, Lansing.

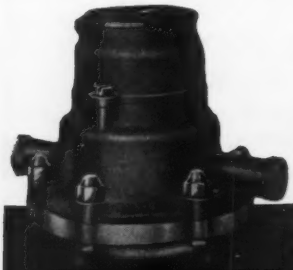
**Gilbert E. Long,** for many years Foreman of the Fairhaven, Mass., Water Co., has been elected Superintendent of the company to succeed the late Henry T. Gidley.

**R. W. Haywood, Jr.,** Water Supervisor with the U.S. Rubber Co., has been transferred from that company's Williamsport, Pa., to its Kankakee, Ill., Ordnance Works.

**Passed Asst. San. Engr. Amos J. Alter** has been assigned to the newly created office of the U.S. Public Health Service in Juneau, Alaska. There he has been loaned to the Alaska Territorial Health Dept. to do general sanitary engineering work on a co-operative program being carried on with the Army, Navy, and Coast Guard in areas surrounding the many military installations. From November 1942 until January 1944, Alter was assigned to the Office of Civilian Defense as Assistant Regional Sanitary Engineer and later as Water Security Engineer.

(*Continued on page 14*)

NIAGARA IRON CASE WATER METERS



provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

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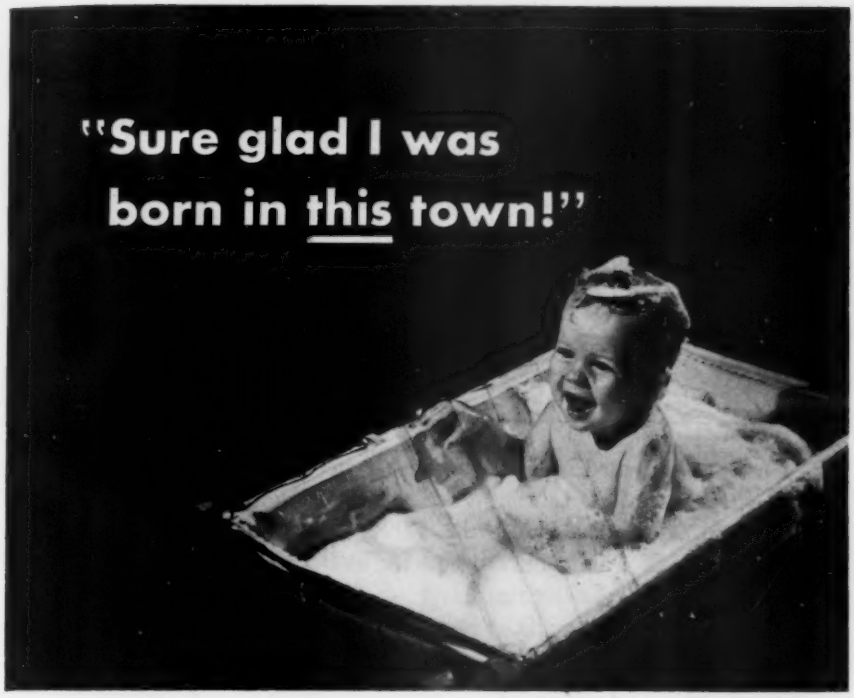
BUFFALO METER COMPANY

Established 1892 2914 Main St., Buffalo, N. Y.




**Good water makes happier, healthier communities . . . plan it now!**

NEXT to the air they breathe, water is about the most important of your citizen's needs. It's Public Utility Number One—and its quality can decide whether or not your community will be happy and prosperous. Hundreds of modern cities realized this before the war—and installed Permutit* equipment to give them soft, clear water from every faucet in town.

Forward-looking city officials are planning *now* for good water as their most important post-war improvement. Get the facts about Permutit's more practical, more economical equipment for municipal water conditioning. Write to The Permutit Company, Dept G2, 330 West 42nd Street, New York 18, N. Y. In Canada: Permutit Company of Canada, Ltd., Montreal.

*Trademark Reg. U. S. Pat. Off.

**PERMUTIT**

WATER CONDITIONING HEADQUARTERS

(*Continued from page 12*)

**J. P. Myron,** Vice-President, Treasurer, and Chief Engineer of the F. B. Leopold Co., Inc., Pittsburgh, died on March 21 at the age of 63, after a 9-week illness.

Mr. Myron, who was born in Barberton, Ohio, went to Pittsburgh as a child, and took his first job after leaving school with the Pittsburgh Filter Co. He left that company in 1922 to form a water works consulting engineering firm with Leo Hudson of Pittsburgh. He joined the F. B. Leopold Co. in 1930.

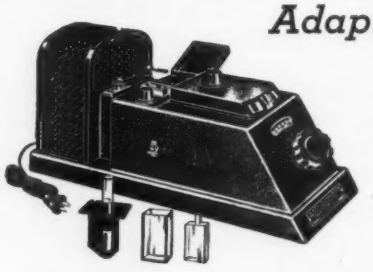
Mr. Myron was a member of the A.W.W.A. and the American Society of Civil Engineers.

**First Lt. Edward N. McKinstry** has been transferred from a Sanitary Corps Unit at Ft. Lewis, Wash., to the Headquarters of the Sanitation Dept., Ft. Douglas, Utah. Lt. McKinstry was Assoc. Public Health Engr. in the U.S. Public Health Service at Bremerton, Wash., before entering the service.

(*Continued on page 16*)

**KLETT SUMMERSON**
**ELECTRIC PHOTOMETER**

*Adaptable for Use in Water Analysis*



**Can be used for any determination in which color or turbidity can be developed in proportion to substance to be determined**

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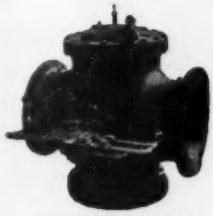
# 1879—ROSS—1879
## AUTOMATIC VALVES



ALTITUDE VALVE

Controls elevation of water in tanks, basins and reservoirs

1. Single Acting
2. Double Acting

Maintains safe operating pressures for conduits, distribution and pump discharge

SURGE-RELIEF VALVE

REDUCING VALVE

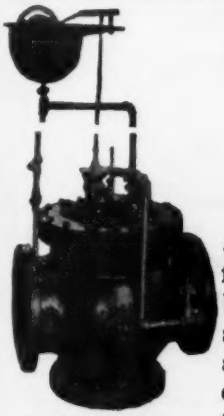
Maintains desired discharge pressure regardless of change in rate of flow

Regulates pressure in gravity and pump systems; between reservoirs and zones of different pressures, etc.

A self contained unit with three or more automatic controls

COMBINATION VALVE

Combination automatic control both directions through the valve.

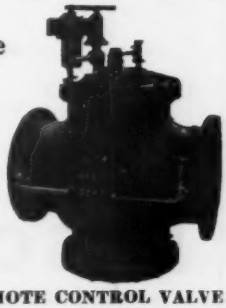


FLOAT VALVE

Maintains levels in tank, reservoir or basin

1. As direct acting
2. Pilot operated and with float traveling between two stops, for upper and lower limit of water elevation.

Electric remote control—solenoid or motor can be furnished



REMOTE CONTROL VALVE

Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

*Packing Replacements for all Ross Valves Through Top of Valve*

**ROSS VALVE MFG. CO., INC., P. O. BOX 593, TROY, N. Y.**

(*Continued from page 14*)

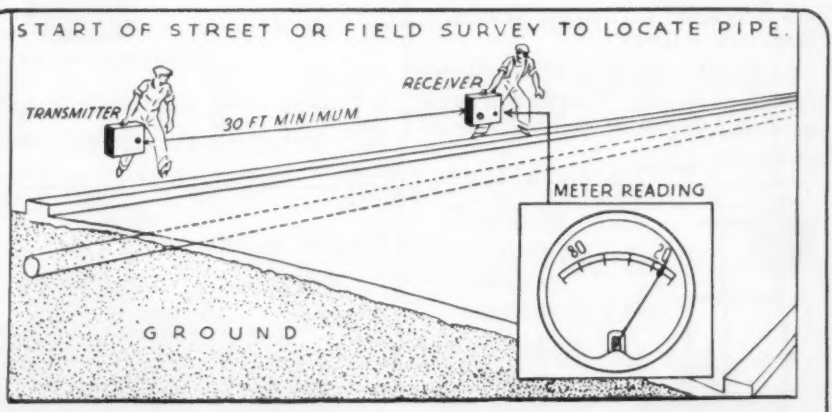
**John C. Luthin,** former Assistant Engineer, Hydraulic Division, California Railroad Commission, is now in the Sanitary Engineering Division of the Arizona State Dept. of Health.

**Kaarlo W. Nasi,** former Assistant Sanitary Engineer, U.S. Public Health Service, attached to the Plague Suppressive Measures Division in San Francisco, is now serving as a district engineer in the U.S.P.H.S. in Honolulu. Nasi was for a time Director of the Division of Public Health Engineering, Territorial Dept. of Health, Juneau, Alaska.

**William K. Foerster,** former Engr. in the Public Service Dept., Burbank, Calif., is now Superintendent of Public Works at Escondido, San Diego County, Calif.

**Capt. E. W. Kearney** has been transferred from Camp Butner, N.C., to Foster General Hospital, Jackson, Miss., where he is serving as Asst. Post Engr. He was formerly with the State Bd. of Health, Morgantown, N.C.

(*Continued on page 20*)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***Exclusively manufactured by the Fisher Research Laboratory***

The M-SCOPE quickly locates the exact position of underground pipe-lines, bends, dead-ends, valves, cast iron bells, stubs, marble obstructions, etc. It determines depth of a pipe-line or metallic conductor. Traces exact course of underground line. It eliminates needless digging and tearing up—saves labor, materials and time.

Write to the Fisher Research Laboratory for latest 16-page booklet explaining the above method.

Please place your order *now* for immediate delivery from our Palo Alto, Calif., or Chicago, Ill., warehouses.

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(on page 76)

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h the Springfield, Mo., Robinson, Ark., to the ex.

nois State Dept. of Biggs Field, Tex., somewhere in the

Co. has trans- York office.

*"The Engineer you wrote for is here, Sir..."*

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ATLANTA, GEORGIA LOCKLAND, OHIO

*Manufacturers of*

*Ferri-Floc* *Copper Sulphate*

(*Continued from page 20*)

**"Water Works Engineering in Disaster"** is a new manual prepared by the Sanitary Engineering Section of the Medical Division, OCD. In its compilation, an attempt has been made to bring together all material of value related to the subject. In addition, certain techniques and procedures are arranged to serve as a ready reference for engineers confronted with emergency water works problems. The manual also deals with "good water works housekeeping methods" that are not only of value under emergency conditions but are essential in regular water works practice.

It is a manual which every water works superintendent should request and keep in his files to refer to at the time of any major accident to the water distribution system.

"Distribution System Maps and Records" is the title of Chap. 3, which is a condensation of the Association's Committee Report on Distribution System Records. The chapter covers recommended mapping practices; primary mapped records, including comprehensive maps, sectional plats, valve records, and supplemental mapped records; card records; and standard symbols.

Other chapters are: Emergency Water Works Operation, including descriptions of emergency plant operation, chlorination, emergency operation of a distribution system, safety precautions, and water sanitation practice; Water Works Maintenance, including descriptions of sources of supply, pumps, prime movers, chemical feeders, regulators and gages, and distribution systems; Pipe Location and Leak Detection; Repair of Water Mains, including descriptions of preliminary operations, temporary repairs, repair of minor breaks, repair of major breaks, and repair of leaks; Contamination of Water Supply, including descriptions of causes of contamination such as damaged water mains, cross connections and back siphonage, and examples of contamination, water-borne diseases, and characteristics of water-borne epidemics; Disinfection of Water Supply Systems, including descriptions of the principles of disinfection, disinfection of water mains

(*Continued on page 42*)

ZECO GREENSAND ZEOLITE

ZECO and HI–ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

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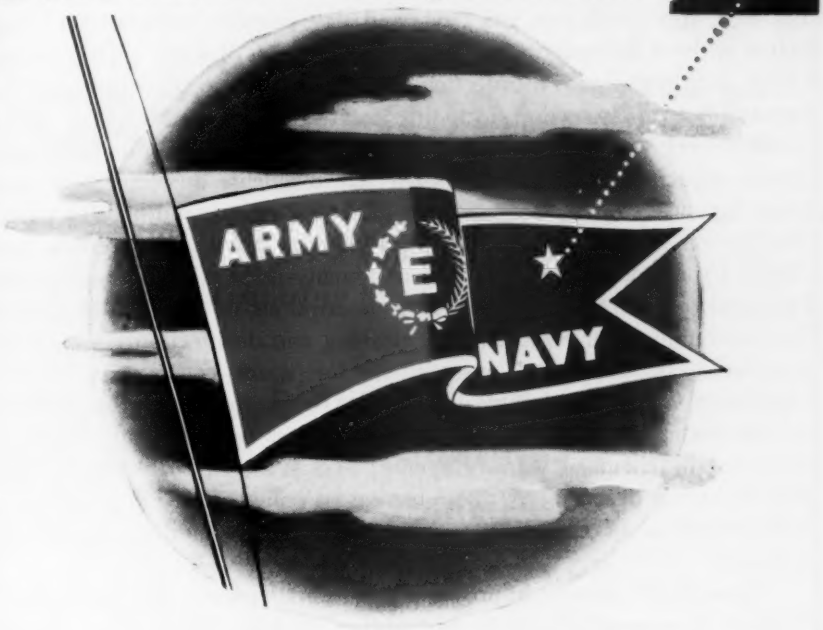
**90 WEST STREET** **NEW YORK 62, N. Y.**

## For *Continued* Outstanding Achievement




Loyally and eagerly, Badger Meter men and women continue to serve for victory, backing the attack by outstanding production of materials needed for war — keeping faith with their co-workers who are now in the Armed Forces.

With understandable pride, Badger Meter folks point to the first star in their coveted Army-Navy "E" pennant that has flown over the Badger Meter plant since June 18, 1943 — tribute to their continued outstanding achievement in war production.

The durability built into Badger Meters and the easy interchange of parts enable water works men to maintain Badger accuracy at commendably low cost, despite wartime restrictions on critical metals. In your postwar planning, put Badger Meters first.

**BADGER METER MANUFACTURING COMPANY**
**MILWAUKEE • WISCONSIN**

*Branch Offices:* New York City, Tampa, Fla., Seattle, Wash. Savannah, Ga., Kansas City, Mo., Marshalltown, Iowa, Waco, Texas, Los Angeles, Calif., Chicago, Ill., Philadelphia, Pa.

(*Continued from page 40*)

and appurtenances (such as hypochlorite solution feed, chlorine gas solution feed, direct chlorine gas feed, and dry chlorine compounds), disinfection without interruption of service, disinfection of water piping systems within buildings, and disinfection of water storage structures; Water Supply for Fire Protection, including descriptions of the Natl. Bd. of Fire Underwriters water supply requirements for fire protection, distribution system capacity, distribution system improvement, auxiliary and static water supplies, storage reservoirs for industrial plants, and booster pumps; Distribution System Hydraulics, including descriptions of fire-flow tests, Hardy Cross method of analysis, and analysis of distribution systems; Temporary Water Service, including descriptions of methods of distribution, minimum water requirements, cleaning and disinfection of equipment, disinfection of water, and instructions for water consumers; Wartime Laboratory Control, including descriptions of recommended tests and their possible indications, chlorine demand test, and treatment of water contaminated by chemical warfare agents; and Water Works Plant Protection, including descriptions of protection of construction, duplication and decentralization of equipment; blackouts, war gas, and protective concealment.

Appendices show: improvised solution feeders; determination of residual chlorine; discharge measurements for main disinfection; flowing-through time for 100 ft. of main; table of equivalents; analysis of compound and equivalent pipes; circle method of analysis; Hardy Cross analysis with aid of the Shand monograph; determination of coefficient of friction from incremental flow measurements; procedures for chlorine demand tests; methods and materials for preventing damage from scattering window glass; and instructions for self-aid in a gas attack.

There are numerous illustrations and a lengthy bibliography. The manual is OCD Publication 2022, December 1943, and is available from the Office of Civilian Defense, Washington 25, D.C.

(*Continued on page 44*)

*Judged the Most Popular*

**ACTIVATED ALUM**

**BLACKALUM**

**PALMER SURFACE WASH SYSTEMS**

**STUART-BRUMLEY CORP.,**
**516 N. Charles Street, Baltimore - 1, Md.**

# CAST IRON PIPE

*Manufactured in Sizes 2" to 96"—*
*A large stock constantly on hand,*
*facilitating prompt shipment.*

**Flanged Pipe**

**Special Castings**

**Flexible Joint Pipe**

**Bell and Spigot Pipe**

**Warren Spun Centrifugally Cast Iron Pipe**

**Short Body B. & S. Specials**

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EVERETT, MASS.

(*Continued from page 42*)

**Louisiana State University Engineering Experiment Station** has issued its Bulletin No. 5 under the title "Source Data on Municipal Water Treatment Plants in the United States." It is compiled by M. C. Shwartz, Asst. Dir. of the Station and Asst. Professor of Chem. Eng. and Research Assoc. in Water Technology, Louisiana State University. The major portion of the pamphlet is a 36 page bibliography of literature on municipal water treatment plants. There is a brief introduction. The bulletin is obtainable from the University Press, Baton Rouge, for $.50.

**The National Fire Protection Assn.** has available a two-color poster describing the use and handling of the chemical solution extinguisher. It can be secured from the N.F.P.A., 60 Batterymarch St., Boston 10, Mass., for 2¢ each, $1.50 a hundred, or $10.00 a thousand. The Association will also provide on request posters and pamphlets for clean-up campaigns, designed to produce salvage as well as reduce fire hazards.

The N.F.P.A. has scheduled its Annual Meeting for May 8–11, at the Benjamin Franklin Hotel in Philadelphia.

(*Continued on page 48*)

KUPFERLE
FIRE HYDRANTS

No. 100 series meets all requirements of A. W. W. A. specifications and is tested and approved by Underwriters Bureau—it has seen over fifty years of use. Complete series for both public and private installations.

JOHN C. KUPFERLE FOUNDRY CO.
ST. LOUIS

Prevent Rusting

Rusta Restor cathodic protection, provides *permanent protection* against rusting of water tanks, piping and steel structures of all kinds.

Initial cost of a complete equipment is about equal to the cost of a good paint job. . . . Operation costs only about 2 mills (i. e. $0.002) per year per square foot of surface protected.

If your tanks and steel structures are not now protected by this proven low-cost method, they should be. No obligation. Send for fully descriptive literature today.

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# Modern Water Treatment Plant Design

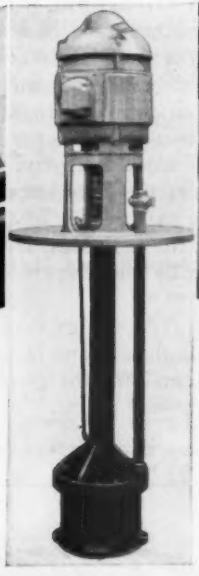
**Employs MIXING & FLOCCULATION Facilities**

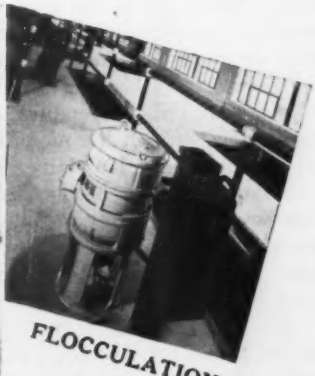
**as separate functional units consisting of**

- ***Mixing*** **by violent turbulence for intimate dispersion of small quantities of chemicals**
- ***Flocculation*** **by mild turbulence for a definite period prior to sedimentation**

**RAPID MIX**

**Large volumes of water at extreme turbulence**





**FLOCCULATION**

**Large volumes of water at low velocities**

***Blue Print Now—Send for Bulletin No. 255***

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(*Continued from page 44*)

**The Los Angeles Dept. of Water and Power Official Bulletin** recently carried this story:

The paradoxical remark that snow is more important to Los Angeles, "the city of sunshine," than perhaps to any other city in the U.S. is true even though the average citizen rarely ever sees snow here—except on a clear day at certain times of the year when he looks at Old Baldy's white-mantled top in the distance.

The reason for this seeming contradiction is that Los Angeles' major supply is derived from the melting snow of the Sierra Nevada Mountains some 350 mi. to the north of the city.

Not only is snow itself important, but it is important also to know how much snow there is each season and, precisely, its water content. This information enables the Dept. of Water and Power to forecast the amount of water that may be drawn from the northern water sheds and to adjust operating conditions so that its facilities may be put to the most efficient use.

This all-important work is done by crews of snow surveyors on skis. In mid-winter, these intrepid fellows begin their journeys into the High Sierras. The course takes them along a 150-mi. crest at elevations of 8,000 ft. to more than 11,000 ft. above sea level. Loaded with packs weighing about 40 lb., party members leave headquarters and head for base camps along the survey route. Base camps are located within a day's ski travel of each other and are provided with food, bedding and essential equipment. A single survey may take from 3 to 10 days, depending on storms, snowslides and general weather conditions. Far back in the mountains the surveyor depends entirely upon his skis for movement and his skiing is work, not play.

Once he leaves headquarters the snow surveyor is "on his own" and the accuracy of the survey and the safe return of the party depends entirely upon the skill and resourcefulness of the individual members. During the 17 yr. that snow surveys have been made by the Department's hydrographic section, no accidents have been reported.

Nothing pleases the snow surveyor more than to find "mountains" of densely packed snow, for he knows that that means ample water for the homes, farms and industries of Los Angeles, and for the generation of more electric energy by the city's San Fransisquito power plants.

(*Continued on page 50*)

PALMER *Filter Bed* AGITATORS

Prevent Sand Beds From Cracking
Eliminate Mud Balls
Save Wash Water
Lengthen Filter Runs
Higher Rates of Filtration

ACTIVATED ALUM • BLACKALUM • PALMER FILTER BED AGITATORS
STUART-BRUMLEY CORP., 516 N. Charles Street, Baltimore - 1, Md.

# COMPLETE SELECTION in Socket Fittings!

Sleeve (Solid)
Fig. 521

Plug
Fig. 523

Flanged Socket
Fig. 528

Cap
Fig. 524

⅛ Bend
Fig. 507

¼ Bend
Fig. 501

Reducer
Fig. 526

Every type of socket fitting needed for water works construction and maintenance is included in Grinnell's line.

Special features of Grinnell Socket Fittings:

1. Improved design cuts size and weight and lessens friction losses.
2. All socket and spigot dimensions and wall thicknesses are the same as A.W.W.A. Standard Class "D" Pipe.
3. All fittings suitable for use with Super-deLavaud centrifugally cast Bell and Spigot Pipe.
4. Although listed for only 150 lbs. working pressure, suitable for 173 lbs. water pressure as specified for A.W.W.A. Class "D" Fittings.

*Write for Catalog 1,*

*"Water Works Specialties".*

GRINNELL COMPANY, INC.

Executive Offices: Providence 1, R. I.

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| Atlanta 2, Ga. | New York 17, N. Y. |
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| Houston 1, Tex. | St. Louis 10, Mo. |
| Los Angeles 13, Cal. | St. Paul 2, Minn. |
| Minneapolis 15, Minn. | San Francisco 7, Cal. |

Seattle 1, Wash.

Tee
Fig. 514

Cross
Fig. 516

Split Sleeve
Fig. 522

Tee
Fig. 511

Warren Coupling
Fig. 533

Long ¼ Bend
Fig. 505

# GRINNELL

WHENEVER **PIPING** IS INVOLVED

(*Continued from page 48*)

**New York City's new Delaware River water** was turned into its main supply on April 5, when Mayor F. H. La Guardia opened the new diversion tunnel at Lackawack, N.Y. (the Catskills), linking the Delaware watershed with the 85-mi. main aqueduct. Use of the aqueduct was delayed following its completion last autumn at a cost variously quoted at $300,000,000 to $325,000,000 by the inability of the city to obtain priorities from the Federal authorities for valves and watergates needed to complete the storage dam.

The diversion tunnel opened in April is a substitute measure until the completion of the dam, which will probably not be achieved until after the war. The tunnel is ¾ mi. long, 16 ft. in diameter, and carries 540 mgd. It will be used for only 50 mgd., however, because of the present adequacy of the Croton and Catskill aqueducts. The chief advantage of the new supply will be that it will increase the pressure in the present water supply.

The opening of the tunnel was attended by New York's Commissioner of Water Supply Patrick Quilty, City Comptroller Joseph D. McGoldrick, President of the Board of Water Supply George J. Gillespie, and Chief Engineer Charles M. Clark.

(*Continued on page 52*)

M H

HIGH QUALITY
VALVES
HYDRANTS

M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.

WHAT'S "EATIN"
YOUR WATER TANK!

The answer is rust—the cure is RUSTOP.

Steel tanks rust from the inside out—and fast. Apply RUSTOP the only known sure *method* of corrosion prevention to all submerged areas.

INSTALL RUSTOP
NO CHEMICALS USED

Rustop is a cathodic, or electrical method that *removes old rust* on submerged areas and *prevents new rust* from forming.

No longer necessary to sandblast, scrape or paint. Cuts down tank repairs and maintenance—extends its life. Installation without interruption to service. Permanent correction at small cost. Operation only a few cents a month. Guaranteed.

Largest cities and industrial firms use RUSTOP. Act. Save that tank.

Cathodic protection approved by Associated Factory Mutual Laboratories —by War Department (Chief Engineers' Office)—by American Water Works Assn.

ELECTRO RUST-PROOFING CORP.
Dayton 10, Ohio, U.S.A.

# HYDRO-TITE

## AND DRY BRAIDED FIBREX

**A DEPENDABLE SELF-CAULKING JOINT COMPOUND FOR CAST IRON BELL AND SPIGOT WATER MAINS**

**HYDRO-TITE** is a self-caulking sulphur base jointing compound used to joint bell and spigot cast iron water mains and soil pipe. It comes in powder form which insures uniformity and quick melting.

When poured into a joint, HYDRO-TITE immediately solidifies upon contact with the metal and bonds to both the surfaces of the bell and the spigot for the entire depth of the joint. It requires no caulking and after pouring a joint, water pressure may be immediately applied.

**HYDRO-TITE** is easy to use, no skill being required to make joints that are tight from the start. Joints made with HYDRO-TITE will stand any pressure the pipe will stand.

**DRY BRAIDED FIBREX**

**USED LIKE BRAIDED JUTE WILL NOT BREED BACTERIA**

**A SANITARY** Packing used in jointing bell and spigot pipe for water, sewer mains and soil pipe.

**FIBREX** was designed for use with Hydro-Tite and other self-caulking compounds, but is entirely suitable also for joints made with lead, and for Sani-Tite and other asphalt sewer joint compounds. Thousands of pounds of Fibrex are already in service on water lines throughout the country.

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**Main Sales Office: 50 CHURCH STREET, NEW YORK, N. Y.**

**Works: WEST MEDFORD STATION, BOSTON, MASS.**

(*Continued from page 50*)

**The Syntron Co., Homer City, Pa.,** is now making a completely self-contained, gasoline hammer paving breaker type of demolition tool.

This hammer is comparable in power to larger sized compressed air paving breakers. It weighs 96 pounds and is arranged for easy operation by one man. It uses moil points, narrow chisels, frost wedges, clay spades, backfill tamping tools, asphalt cutters, sheathing drivers or ground rod driving tools, etc., all with $1\frac{1}{8}$"x6" shanks.

Throttle control of the blow permits placing the tool on the spit desired to be worked, without jumping around. With a solid star drill, and using water to flush the cuttings out of the hole, the hammer will drill rock to a depth of 30".

In principle, it consists of a 2-cycle gasoline engine in an inverted position, with two pistons—an engine piston and a hammer piston. Fuel (gasoline mixed with oil) consumption is relatively low, the hammer being equipped with a fuel tank having a capacity sufficient for several hours operation. The motor is started by a rope pull, in the same manner as is any outboard engine.

**National Calibration Service, Brooklyn, N.Y.,** has been purchased by Foster D. Snell, Inc., Cons. Chemists and Engrs., Brooklyn. National Calibration Service .was engaged in the verification of vertical compression and tensile testing machines and Foster D. Snell, Inc., will continue and expand the firm's activities.

**Dresser Mfg. Co.** has returned this year to the manufacture of Style 85 Bellmaster Joint for cast iron pipe, first devised in 1941 and then

(*Continued on page 54*)

***PREVENT WEAR AND CUTTING of rods, plungers and shafts by using***

Trade Mark MABB'S Reg. U. S. Pat. Off.

**MABBS RAWHIDE PACKING**

**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**

# Cuts Operator's Time to 5 Minutes

**Here is another exclusive improvement added to Refinite Solo Valve controlled water softeners—the Refinite Salt-O-Matic Brining System (pat. pend.). With it regeneration is reduced to these simple operations: (1) At end of softening run operator sets valve for backwashing. (2) When Alarm Bell signifies end of backwashing, valve is placed in brining position. (3) At end of brining, alarm rings and solo valve is placed in service position. No other valve adjustments are needed. Actually, during the entire regeneration process, less than 5 minutes of the operator's time is required.**

**Refinite, manufacturers of quality water conditioning equipment, will gladly discuss your water problems with you. Write Refinite today. There's no obligation.**

## The Refinite Corporation

Write for free catalog SINCE 1917 108 Refinite Bldg., Omaha

(*Continued from page 52*)

held off the market, because of restrictions on expansion of production facilities.

A new folder describing the joint has been issued by Dresser, and particularly stresses the joint's resistance to corrosion and its flexibility.

**The Engineers' Society of Western Pennsylvania** has published the proceedings of its 4th Annual Water Conference. The book is available for distribution at $3.15 per copy, from the society at the William Penn Hotel, Pittsburgh, Pa.

The 5th Annual Water Conference of the society will be held at the above address on October 30 and 31 with H .M. Olson as Chairman.

**A "Guide to Weldability of Steels"** has been published by the American Welding Society, 33 West 39th St., New York 18, N.Y., and is available for $1.00 a copy. The 90-page book, which includes tables and charts, proposes a system for the predetermination and preservation of desired ductility in the heated zone of higher carbon and low-alloy steels during welding. Part of the book is devoted to an instruction manual with step-by-step examples showing the use of the system to select steels and to predict welding conditions necessary for the preservation of desired ductility in the heated zone.

Sterilators by Everson

**Water Purification**

Single valve control for easier operation, quick, exact adjustments to changing conditions.

Automatic shut-off indicates accidental breaks in mains. Also increases operational efficiency in feeding chlorine.

Rota-Meter Visible Gas Feed Indicator —99½% accurate in measuring gas flow.

Sizes to meet any capacity range requirement. Automatic, semi-automatic, or manual control of gas feed.

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**SOFTENING SYSTEMS**
All Types *and* Capacities—Zeolites (*synthetic and natural*) and Lime and Soda

**CHEMICAL FEEDERS** (wet or dry)
Acids . . . Hypochlorites . . . Alkalies

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SWIMMING POOL EQUIPMENT
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HOUSEHOLD, ETC.

322 LEHIGH AVE., PHILA., PA.

# NEWS OF THE FIELD

**In 1915, almost 30 years ago,** the following editorial statement was written by M. N. Baker in *Engineering News,* just at the close of the American Water Works Association convention held that year in Cincinnati:

From time to time the American Water Works Association tries to find itself. It made the attempt at its annual meeting at Cincinnati last week.

In the thirty-five years of its existence the Association has several times lost about all of its psychic self that it had previously found. With that loss went membership, financial strength, and prestige as an association. By arduous work on the part of a few the Association has recently forged ahead. It now has a much larger membership than ever before; it is financially sound at present and may remain so if it does not become over-ambitious; it has established a useful quarterly *Journal;* it is rapidly forming geographical and technical sections; it has done much good committee work of late, although it is slowing up in that field; through the Water Works Manufacturers' Association, the associate members have been put on a dignified and useful footing.

Notwithstanding all this gain, the Association has not yet wholly found itself. It has cast off much of the levity and all of the semi-official sanction of dissipation which so nearly wrecked it at the age of twenty-one. It has abandoned the financial looseness and happy-go-lucky customs which sapped its strength at from twenty-five to thirty years of age. But it has not yet decided whether it wants to be a united brotherhood of water works superintendents or a technical society.

Many of the members appear to feel that in adopting more business-like methods of electing officers and in curtailing the frolic of choosing the next meeting place they have lost some of their vested rights. Many, too, seem inclined to resent the filling of so many of the offices of the Association with engineers and other technical men—forgetting that much, if not most, of the recent growth of the Association is due to the consulting engineers, chemists and bacteriologists.

Perhaps the greatest danger immediately ahead of the Association is over-ambitious attempts at expansion. At the worst of its second period of financial straights there was a strong demand for the establishment of permanent headquarters and a well-paid full-time secretary. Then, as now, these things are financially impracticable.

Another ambition that seems unlikely of realization for a considerable period is the absorption or affilitation of all the other water works associations of the country. Before the American Water Works Association can attain this object it must find itself. The rival which it has at last outdistanced in membership found itself long ago. The New England Water Works Association has no uncertainty as to whether it is a fraternal or a technical organization. It knows that it combines in one many of the best features of both. It

(*Continued on page 2*)

(*Continued from page 1*)

knows how to give honors to, and how to get work from, both the "practical" superintendent and the professional man. . . .

It seems necessary . . . to say that unless the American Water Works Association finds itself it may find, instead, that it has lost many of its ablest and hardest-working members—as it came so near doing a few years ago. . . .

Go to it then! Find yourself, American Water Works Association! It will be well worth while—even though the New England Water Works Association persistently refuses to be more than a sister.

Since it was a command to the Association to find itself, a review of the 30 years that have elapsed is warranted now.

That JOURNAL, which was a quarterly, has these many years been a successful monthly. Geographical sections now cover the entire North American continent and include an island section—Cuba. Technical committee work has resulted in the development of many fine specification documents which are nationally recognized.

The end of April 1944 finds more than 5200 members of the A.W.W.A. banded together in purpose and achievement for the benefit of all water supply operations.

Many leaders in the field feel more strongly than ever that the American Water Works Association and the New England Water Works Association should find a way to unite in one strong continent-wide body of water works men. The executive committee of the A.W.W.A. has within recent months suggested to the executive committee of the N.E.W.W.A. the desirability of a conference to appraise the benefits which might accrue from a formal integration of the activities of the two associations. It is hoped that such a conference can be held and that results to the benefit of all water works men will come from it.

**Having completed an overseas water supply mission** for Gen. T. B. Larkin, William E. Stanley, Prof. of San. Engr. on military leave of absence, Cornell University, has returned to civilian status. He is currently teaching water supply and water treatment on a temporary appointment as Professor of Sanitary Engineering at the Massachusetts Institute of Technology.

As Major in the Corps of Engineers, Stanley was for 5 months Water Supply Officer with the Central Task Force for the North African Invasion and the Mediterranean Base Section, for 2 months Water Supply Officer in the Tunisian campaign, and for 8 months Chief of the Construction Branch, Headquarters Service of Supply, North African Theater of Operations.

(*Continued on page 4*)

# A life-giving drink of fresh sea water

PERMUTIT DESALTING BAG
INSTRUCTIONS
1-FILL BAG TO LINE WITH SEA WATER
2-ADD BRIQUET OF CHEMICAL. ROLL TOP OF BAG DOWN AND STRAP SECURELY.
3-ALLOW BRIQUET TO STAND FOR A FEW MINUTES. THEN KNEAD BAG WITH HAND FOR 10 MINUTES UNTIL BRIQUET IS BROKEN INTO A FINE POWDER.
4-SHAKE BAG OCCASIONALLY FOR 20 MINUTES SO DESALTING MATERIAL IS KEPT IN CONTACT WITH WATER.
5-NOW SUCK CLEAR FILTERED DRINKING WATER THROUGH OUTLET TUBE.
THE PERMUTIT COMPANY
WORLD'S LEADING WATER CONDITIONING SPECIALISTS FOR MORE THAN 30 YEARS
PATENT PENDING

THIS flyer, down at sea, may suffer many hardships. But he'll be spared the most dreaded of all—thirst. He'll drink sea water—and live!

Stowed in his rubber raft, he'll find a Permutit* Sea-water Desalting Kit. It consists of a plastic bag and a supply of salt-removing briquets. That's all he'll need to change salt sea water into fresh, clear drinking water in a few minutes. The kit occupies only one-tenth the space of the drinking water it produces.

The Desalting Kit was developed by chemists and engineers at Permutit, and accepted by the U. S. Navy, Army and Air Transport Command.

Permutit is helping thousands of war plants and Army and Navy establishments to do a better war job. We are proud indeed that our skill enables us also to make the tough job of our front-line fighting men a little easier, a little safer.

The Permutit Co., Dept. G2, 330 West 42nd St., New York 18, N. Y. Permutit Co. of Canada, Ltd., Montreal. *Trademark Reg. U. S. Pat. Off.

**PERMUTIT**

**Serving industry and the armed forces...with GOOD WATER**

(*Continued from page 2*)

**Frank C. Amsbary, Sr.,** 81, former President and Manager of the Champaign and Urbana, Ill., Water Co., died on April 9. Mrs. Amsbary, 79, died 5 hours later, without knowing of her husband's passing. The couple had been married 56 years.

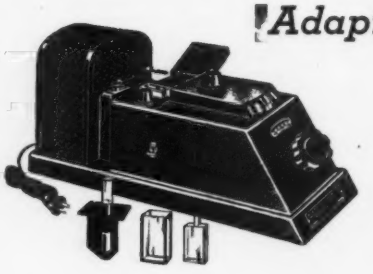
Mr. Amsbary was born in Pekin, Ill., and began working at 15 in general stores and "on the railroads." He commenced his career in water supply in 1885 as Superintendent of the Pekin Water Works, and subsequently operated plants in Witchita, Kan., and Little Rock, Ark. 1899 brought him to the Champaign Water Co. He retired in 1927, to be succeeded by his son, Frank C. Amsbary, Jr.

Mr. Amsbary was an active citizen as well as servant of the community in which he lived for 45 years. He was President of the Champaign School Board, the Chamber of Commerce, the Y.M.C.A. Board, and the First Federal Building and Loan Assn., and a charter and honorary member and Director of the Rotary Club.

(*Continued on page 6*)

KLETT SUMMERSON
ELECTRIC PHOTOMETER

*Adaptable for Use in Water Analysis*



**Can be used for any determination in which color or turbidity can be developed in proportion to substance to be determined**

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TORONTO • TULSA • VANCOUVER • WASH.

(*Continued from page 4*)

**Egon T. Zentner,** 36-year-old emigré from Czechoslovakia, died suddenly on April 27, just as he was expecting to receive his U.S. citizenship and to be admitted to professional engineering in the state of New Jersey. He was engaged in organic chemistry research at the Virginia-Carolina Chemical Corp. Research Dept. at Carteret, N. J.

Dr. Zentner graduated in 1932 from the Technical University in Vienna and received a doctorate in chemical engineering there in 1937. He fled Czechoslovakia after the entry of the Nazis, going first to France, and entering the United States on Feb. 26, 1939.

Dr. Zentner's professional experience in Europe was with water conditioning organizations and his first employment here was with the Permutit Co., primarily in connection with the development of the "Spiractor," which he had invented and developed in Czechoslovakia. He was also at the University of Texas for a year. He joined the A.W.W.A. in April 1940.

Dr. Zentner's sister, Dr. Margot R. Zentner, is a Research Chemist at Hoffman LaRoche. His parents are in a Nazi concentration camp.

**Albert L. Solleder** of New York is going to Caracas, Venezuela, for the firm of Parsons, Brinckerhoff, Hogan & Macdonald, as Design Engr. on the Caracas water, sewer and dam project.

Solleder was formerly with the U.S. Engineers' Trinidad District, where he was Prin. Engr. in charge of design and operation of water works and sewage facilities. Before that he was Asst. Engr. with the Caribbean Architect-Engineer, under G. Gale Dixon, and was engaged in design of water and sewer plants and appurtenances for U.S. Army bases in the Caribbean.

(*Continued on page 8*)

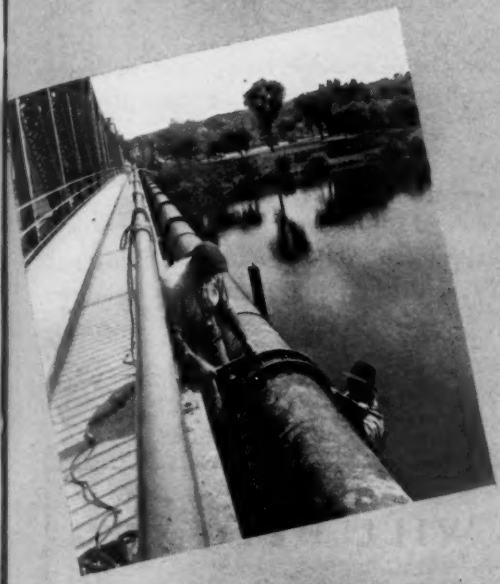
**NIAGARA IRON CASE WATER METERS**

provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

**WRITE FOR CATALOG.**

**BUFFALO METER COMPANY**
Established 1892 2914 Main St., Buffalo, N. Y.

# Pipelines can STRETCH - SHRINK - SHIFT with "DRESSERS"



Two resilient gaskets inside each Dresser Coupling flex and "follow" both lateral and longitudinal pipe movements, yet maintain a constant seal between pipe and coupling.

Dresser-coupled lines absorb all normal and much abnormal pipe movement *without setting up harmful stresses and strains.*

There is no rest for a pipeline. Constantly it is subject to the forces of nature—temperature change, earth movement, wind and rain. It must respond to many more forces made by man—vibration from moving machinery, stresses and strains of many kinds.

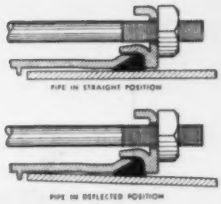
Some or all of these enemies of tightness are present in every pipeline whether it is large or small, under or over the ground, miles long or a few short feet, wherever it may be and whatever it may carry.

Through the years only one pipe-joint has fully proved its ability to automatically absorb these harmful stresses. That is the Dresser Coupling for plain end pipe—the *flexible* pipe-joint which permits each pipe length to move independently.

**Investigate "Dressers"**—Fast and easy to install, ready-made, with flexibility built-in, Dresser Couplings, Fittings, Repair Clamps and Sleeves are available for practically all kinds and sizes of pipe.

*These Hottentot twins and their Eskimo brothers emphasize the pull and push—expansion and contraction—to which pipelines are subjected. Each Dresser Regular Coupling will absorb up to 3/8" in-and-out movement. Dresser Expansion Joints are available where greater longitudinal pipe movement is concentrated at one point.*

*This is how Dresser Couplings, through their resilient gasket seal, absorb vibration and deflection of 4° or more depending on size.*




**Save Man Power with Dresser Couplings**

*In Canada: Dresser Manufacturing Co., Ltd., 60 Front St., West, Toronto, Ont.*

## DRESSER MANUFACTURING COMPANY

*ONE OF THE DRESSER INDUSTRIES*

BRADFORD, PENNSYLVANIA

(*Continued from page 6*)

**From a front-line battlefield,** Col. Thomas C. Green wrote on April 8 to Harry E. Jordan, A.W.W.A. Secy., that he had just received the February issue of the JOURNAL.

Col. Green's V–Mail note continues:

"Don't know who thought to send it. If you know please thank them for me. It is most welcome, as it is the first copy I've seen in the fifteen months since I left the States. It is rather an interesting experience to read the Water Works JOURNAL while listening to artillery shells both coming and going.

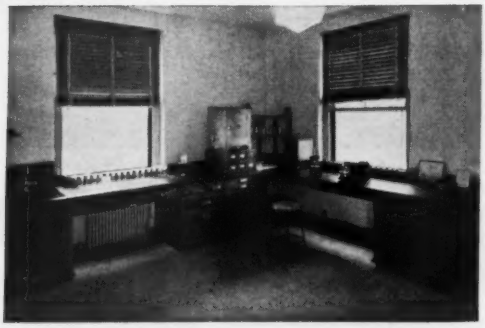
"Don't expect I'll be able to make the Milwaukee convention, but have high hopes that the 1945 roll call will find me present. Please give my regards to all the fraternity.

"Thanks again for the JOURNAL. You can bet I'm looking forward to getting back to the Filter Plant in Austin, Texas."

It was told in the January "News of the Field" that Col. Green won the Legion of Merit for "exceptionally meritorious conduct" in Sicily last summer. Col. Green was Supt. of the Austin Filter Plant. He has been in the Service since November 1940.

(*Continued on page 10*)

*Sheldon* . . . WILL HELP YOU



**Experienced Sheldon Planning and Installation Engineers will assist you in planning, selecting and installing laboratory control facilities which will meet your needs efficiently.**

*Write today for our Sheldon Catalog showing Wood and Metal Laboratory Furniture. Ask that a Sheldon Engineer call.*

E. H. SHELDON & CO.

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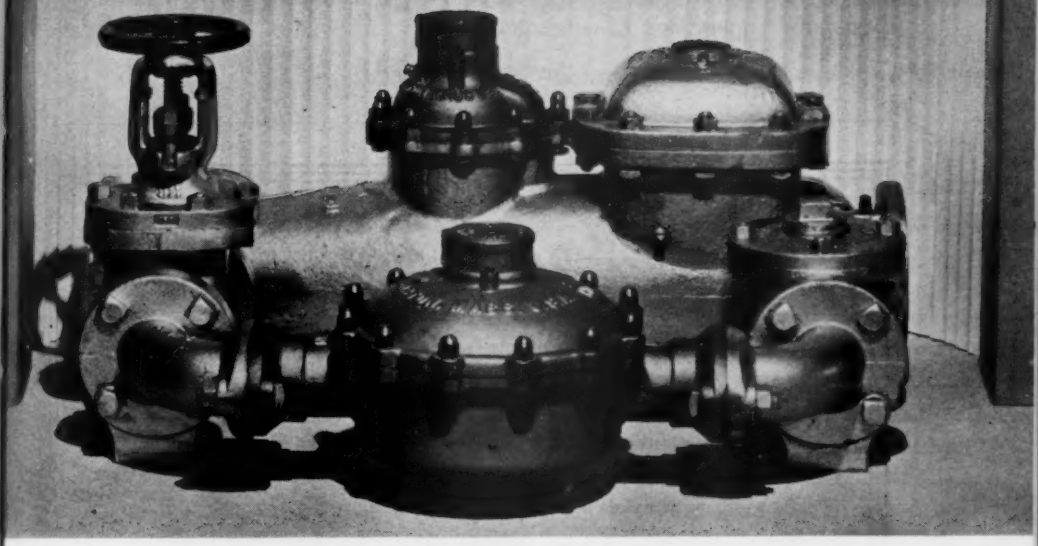
# HERSEY



## THE HERSEY DETECTOR METER

**has never been equalled for its accuracy in metering fire services. It always delivers the full capacity of the supply pipe without endangering the pressure. Accepted by Water Works officials. Approved by the National Board of Fire Underwriters.**

**HERSEY MANUFACTURING COMPANY**
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**BRANCH OFFICES:**
NEW YORK — PORTLAND, ORE. — PHILADELPHIA — ATLANTA — DALLAS — CHICAGO — SAN FRANCISCO — LOS ANGELES.

(*Continued from page 8*)

**H. P. Jones & Co., Toledo, Ohio, has become Jones & Henry,** with the appointment of Thomas B. Henry, long an associate of Harvey P. Jones, as a partner in the firm.

Jones was City Engr. of Toledo from 1916 to 1918, and from 1918 to 1925 was associated with Fuller & McClintock of New York. During the latter part of that period, he was in charge of their Toledo office. He formed the firm of H. P. Jones & Co. in 1925, and since then has handled municipal and industrial engineering problems throughout the Middle West. He recently made special investigations relating to a new water supply for Toledo.

Henry served for 21 months overseas in World War I. After his graduation in 1919 from the University of Pennsylvania, he was engaged on design and construction of water supply, sewers, townsites, etc., in Florida. From 1925 to 1927 he was City Engr. of West Palm Beach, during which time he supervised $10,000,000 of municipal improvements, including water supply, sewers, reclamation work, etc. He has been with H. P. Jones since 1927, in responsible charge of investigations, reports, designs, and supervision of construction.

(*Continued on page 12*)

*Send Us Your Orders Now!*

**Although a large part of our facilities is being used to produce war materials for our armed forces, we are able to manufacture a complete line of Water Works Products. We suggest that you make a seasonal check-up of your Water Works requirements and let us have your orders now. We want to be in a position to fill your needs with *enough* and on *time*.**

***BACK THE ATTACK—BUY MORE WAR BONDS***

OUR SEVENTY-FIFTH ANNIVERSARY

HAYS MANUFACTURING CO. • ERIE • PA.

WATER WORKS PRODUCTS

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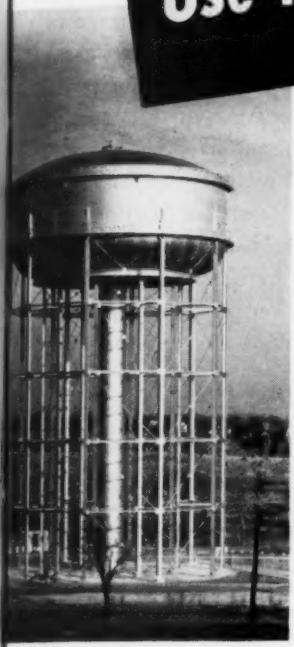
★ Invest in Bonds today to provide for extensions tomorrow ★ ★ ★

# PUT FIRST THINGS FIRST ON YOUR PUBLIC WORKS PLAN—

## Use PITTSBURGH • DES MOINES ASSISTANCE NOW!



**SURVEY** *your improvements needs*

**PROGRAM** *their sequence of importance*

***PLAN** and specify each project in detail*

**FINANCE** *through developed funding methods*

**SCHEDULE** *construction—purchase land or rights*

**BUILD** *when conditions permit!*

Detailed planning of your future construction—in the coming months while time permits—places your community in a position to profit by immediate readiness to build when postwar conditions are ripe. Awaiting your call are the complete engineering facilities of this organization—the understanding and experience gained through 50 years of service to the American municipality. *Write for a consultation.*

Blueprint Now!

**PITTSBURGH-DES MOINES STEEL CO.**

PITTSBURGH, PA., 3424 NEVILLE ISLAND—DES MOINES, IOWA, 925 TUTTLE STREET
NEW YORK, ROOM 921, 251 BROADWAY · CHICAGO, 1228 FIRST NATIONAL BANK BUILDING
DALLAS, 1229 PRAETORIAN BUILDING · SAN FRANCISCO, 631 RIALTO BUILDING
SEATTLE, 1132 EIGHTH AVENUE, SOUTH

(*Continued from page 10*)

**Thomas R. Camp** has resigned from the faculty of the Massachusetts Institute of Technology to open offices in Boston as a consulting engineer.

Camp graduated from Texas A. & M. College in 1916 and received his master's degree from M.I.T. in 1925. He has been engaged in hydraulic and sanitary engineering for the past 25 years, and has been in charge of sanitary engineering at M.I.T. for the past 15 years. He has been associated with the late John B. Hawley in Texas, with the firm of Spoon, Lewis and Camp in North Carolina, and with the late Alexander Potter in New York and New Jersey. He is the author of about 35 scientific and technical papers and discussions, including 3 sections in Davis's *Handbook of Applied Hydraulics,* dealing with water supplies, water distribution and water treatment. He was the first recipient of the Karl Emil Hilgard Hydraulic Prize of the American Society of Civil Engineers, and has received both the Hydraulic Section and Sanitary Section prizes of the Boston Society of Civil Engineers. He has been an A.W.W.A. member since 1930.

(*Continued on page 14*)


# SAVE FOR VICTORY

**EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.**

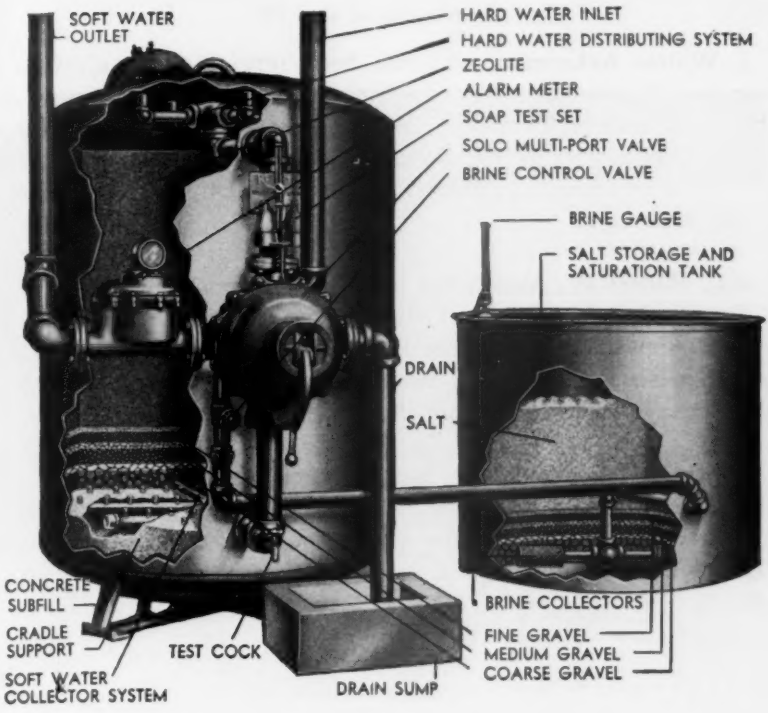
***Now is the time to do your part—SAVE FOR VICTORY***

## National Water Main Cleaning Co.

**30 Church St., New York, N. Y.**

**BRANCHES**

**115 Peterboro St., Boston, Mass.**
**910 William Oliver Bldg., Atlanta, Ga.**
**7103 Dale Ave., St. Louis, Mo.**
**576 Wall St., Winnipeg, Man., Canada**
**3812 Castellar St., Omaha, Neb.**
**205 West Wacker Drive, Chicago, Ill.**
**501 Howard St., San Francisco, Calif.**
**2028 Union Ave., Montreal, Canada**
**P. O. Box 683, Jacksonville, Fla.**




# *EFFICIENCY PROVED!*

Developed by Refinite, the H-I Zeolite softener is a ruggedly constructed, yet simple, efficient and economical unit used in municipalities throughout the nation. Notice the many features of this softener . . . the simple multiport valve control, the bell alarm meter system, the efficient distributor and collector systems, the space-saving combination salt storage and saturation tank. Notice also the *full* tank of Zeolite—which is possible with no danger of loss in backwash. After more than 25 years of operation in many communities these Refinite softeners are still giving efficient, economical service. Consult Refinite on your city's water problem. Refinite is prepared to design and build equipment to meet your specific requirements. Write Refinite today . . . there's no obligation.

"Conditioned Water—An Investment that Pays for Itself."

## The Refinite Corporation

*Write for Free Catalog*

108 Refinite Bldg., Omaha, Nebr.

(*Continued from page 12*)

**J. Walter Ackerman,** who has been serving as Analyst in the Water Sec., Power Div., War Production Bd., has retired because of ill health to his farm in Munnsville, Madison County, N.Y. Ackerman was formerly Chief Engr. and Gen. Supt. of the Consolidated Water Co., Utica, N.Y. He is an Honorary Member and one-time Director and Trustee of the A.W.W.A.

**Maj. Robert W. Austin** has been transferred from troop duty in the Chemical Warfare Service Unit Training Center, Camp Sibert, Ala., to the Procurement District Office of the C.W.S. in New York. He is engaged in contract renegotiation work. In civilian life, Maj. Austin was Hydr. Engr. with the N.Y. State Public Service Com.

**Robert O. Shephard,** who has been serving as San. Engr. in the Post Engr.'s Office, Camp McCain, Miss., has returned to Meridian, Miss., where he was associated with the water dept. for 2 years before the war. He is now in complete charge of water supply, sewage disposal, and sanitation.

(*Continued on page 16*)

**Prevent Rusting**

Rusta Restor cathodic protection provides *permanent protection* against rusting of water tanks, piping and steel structures of all kinds.

Initial cost of a complete equipment is about equal to the cost of a good paint job. . . . Operation costs only about 2 mills (i. e. $0.002) per year per square foot of surface protected.

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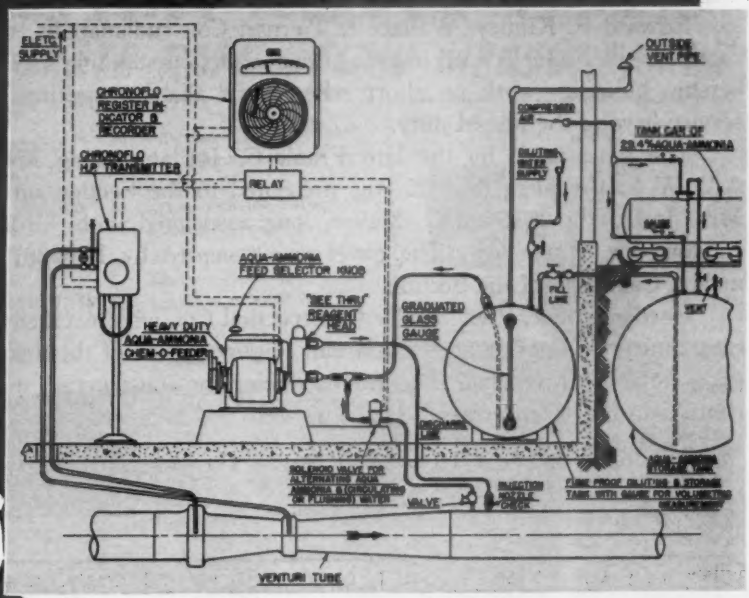
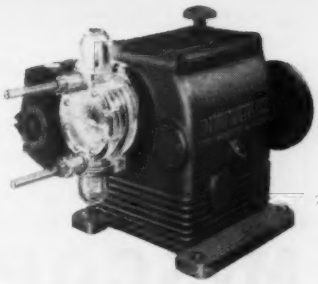


# AMMONIATION WITH HEAVY DUTY CHEM-O-FEEDER

LAYOUT shown is for feeding aqua ammonia or ammonium sulphate solutions in proportion to variable flow with 100% ± 1% accuracy when flow is within range of control meter. This equipment, adaptable to previously installed Venturi or mechanical meters, is low in first cost and in cost of chemical fed. Temperature variations do not affect accuracy of rate of feed. Unskilled help may safely handle equipment as system is under atmospheric pressure. Flexibility, safety and elimination of refrigerating effect make this solution feeding attractive and economical for water works, paper mills, power plants, swimming pools, etc.



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Heavy Duty Chem-O-Feeder
used in ammoniation system illustrated

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*"Chemical Feeder Headquarters"*
61 CODDING ST., PROVIDENCE 1, R. I.

(*Continued from page 14*)

## REPORT OF INDIANA SECTION MEETING

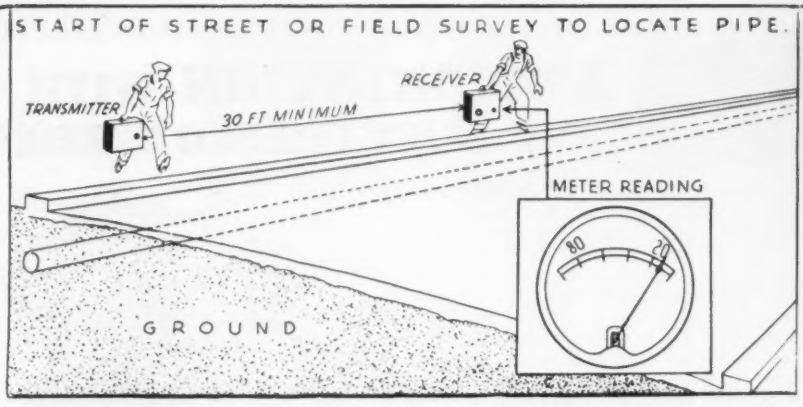
The 27th Annual Meeting of the Indiana Sec., A.W.W.A., held in affiliation with the Indiana State Bd. of Health, convened on April 13–14 at the Antlers Hotel in Indianapolis. Total registration was 222.

Edward F. Kinney, Wallace & Tiernan Co., Indianapolis, was nominated for the Fuller Award in recognition of his outstanding loyalty, membership building, work on short schools and district meetings, and for service beyond the line of duty.

The gavel used by the late Frank C. Jordan during his term as A.W.W.A. President in 1925 was presented to the Section on behalf of Mrs. Jordan by William C. Mabee, long associated with Jordan at the Indianapolis Water Co. The gavel was accepted by Howard W. Niemeyer, Chairman of the Section.

Gordon Miller, Pres., Miller Construction Co., who installed telephone communication lines along the Alaskan Highway, told of the many experiences he and his men had encountered during the construction work in the north country in temperature far below zero.

(*Continued on page 18*)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***Exclusively manufactured by the Fisher Research Laboratory***

The M-SCOPE quickly locates the exact position of underground pipe-lines, bends, dead-ends, valves, cast iron bells, stubs, marble obstructions, etc. It determines depth of a pipe-line or metallic conductor. Traces exact course of underground line. It eliminates needless digging and tearing up—saves labor, materials and time.

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**PALO ALTO, CALIFORNIA**

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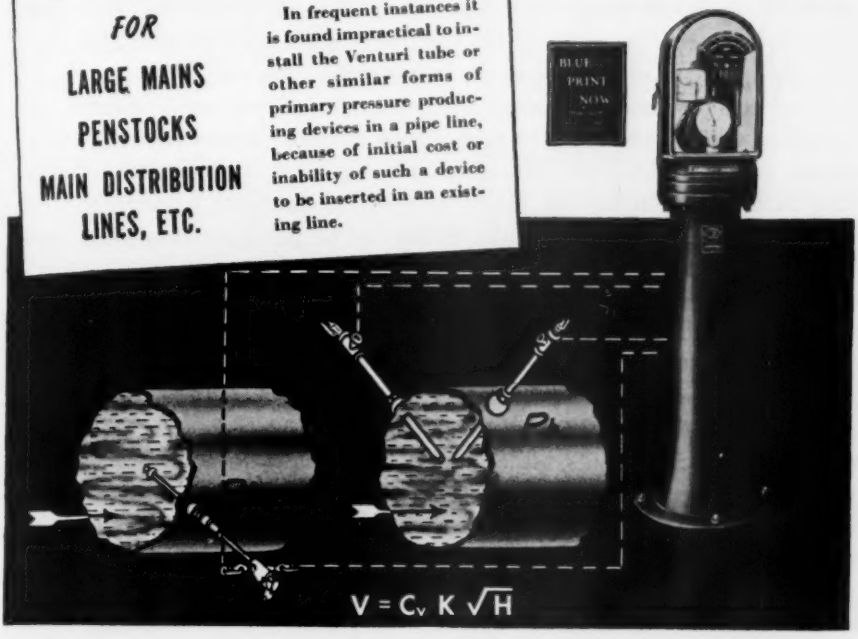
## Permanent PITOT TUBES with MO METER

### FOR ACCURATE RATE OF FLOW MEASUREMENT

FOR
LARGE MAINS
PENSTOCKS
MAIN DISTRIBUTION
LINES, ETC.

In frequent instances it is found impractical to install the Venturi tube or other similar forms of primary pressure producing devices in a pipe line, because of initial cost or inability of such a device to be inserted in an existing line.




Many plants are using Simplex Type PH or Type PFA pitot rods as effective and inexpensive head producing devices, used in conjunction with a Simplex MO meter register. The Type PH Pitot Rods permit the meter instrument to respond promptly to wide instantaneous changes in flow rate. The Type PFA Pitot Rod has the impact and reference orifices combined in one tube, and is recommended for permanent use where instantaneous flow variations are not excessive.

The accuracy of the flow rate reading obtained by an installation using Simplex Pitot Rods and MO Meters is comparable in all respects with the accuracies provided by a Venturi tube.

Simplex Pitot Rods are installed in existing lines without undue interruption in plant operation, and our Sales Department will gladly provide full engineering details involved in any particular application.

**SIMPLEX VALVE & METER CO.**
**6784 UPLAND STREET, PHILADELPHIA 42, PA.**

(*Continued from page 16*)

A clinic on postwar planning was conducted by H. S. Morse, Chairman, Indianapolis Postwar Planning Com.'s Subcom. on Public Utility Services and Vice-Pres. and Mgr. of the Indianapolis Water Co. E. L. Filby, Field Dir., Com. on Water and Sewage Works Development, New York, explained the "Blueprint Now" slogan and program. Water conditioning and softening plants are especially worthy of postwar consideration, he believes. One item generally neglected in the formulation of plans is the publicizing of the postwar projects, and Filby urged more emphasis on public relations programs. Raymond Pike, Dir., Indiana Economic Council, reviewed the work of his committee since its inception last year, and George A. Kuhn, Chairman, Indianapolis Postwar Planning Com., outlined the recommendations of his group as follows: public health and sanitation equipment should be modernized, blighted areas corrected, recreational and educational facilities developed, and promotion of postwar planning furthered in industrial plants in order to facilitate conversion from war to civilian production. Kuhn stated that all public utilities plans were "beyond the talking stage."

The general program of the meeting follows:

*Experiences During the 1943 Floods:* This symposium, conducted by M. H. Schwartz, Vincennes, stressed the trials that several water works along the Wabash River endured last year, and discussed the general preparedness for emergencies and the amount of help which was made available to the stricken plants, either by local authorities or from nearby communities. Participants in the symposium were: F. M. Hartman, Wabash; Glen Garman, Lafayette; C. A. Robbins, Delphi; and Leo Louis, State Bd. of Health. Two of the men scheduled to tell about their experiences last year had to stay home to handle high waters lapping at their "doorsteps" this year.

*Depreciation—Fact or Theory:* L. R. Howson, Past Pres., A.W.W.A., in the course of his discussion described a detailed study of the deprecia-

(*Continued on page 20*)

ZECO GREENSAND ZEOLITE

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

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# ARE YOU DESIGNING NOW FOR THE PEACE-JOB AHEAD?

When Victory is won, the big peace-job must be underway. Millions of returning service men and millions of war workers will want to get back on peacetime payrolls. Industries, utilities and governments (all the way from villages to federal agencies) must be *ready* with their plans.

No doubt you have many needed waterworks extensions and improvements that have been postponed because of the vital need for war materials. These are the job-giving peacetime projects you can plan now.

Before your detailed plans are made ready for the drawing board, we'd like to talk with you about ARMCO Spiral Welded Steel Pipe.

We should like to discuss with you how and why the right design of your waterworks systems with ARMCO Spiral Welded Steel Pipe will assure economical and efficient operation. This means the correct wall thickness, the right diameter, joints, fittings and accessories. And we'd like to tell you about the many practical advantages of this steel pipe in waterworks service.

**WRITE FOR THIS PAPER**

Meanwhile, it will pay you to read a valuable article on *"Outline of Design Factors for Steel Water Pipe Lines."* It was written especially to show the advantages of specific design for every type of pipe line. Write for a copy. It's free. The American Rolling Mill Company, 781 Curtis St., Middletown, Ohio.

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ARMCO

**ARMCO STEEL PIPE**

MEETS A.W.W.A. STANDARD SPECIFICATIONS

(*Continued from page 18*)

tion of cast-iron pipe, and referred frequently to the definition of depreciation as given in the report of the Natl. Assn. of Railroad and Utilities Comrs.

*Control of Taste, Red Water and Bacterial Aftergrowth in the Distribution System:* A. E. Griffin, Tech. Dept., Wallace & Tiernan Co., briefly outlined methods by which plant operators could control such supply problems.

*Power for War:* L. S. Schiesz, Vice-Pres., Public Service Co. of Indiana, explained the planning which had given Indiana one of the most completely co-ordinated power systems in the country, one which was able in 1941 to supply power to TVA during its water shortage.

*Lessons from the Recent Northern Indiana Typhoid Fever Epidemic:* Dr. Thurman B. Rice, State Health Comr., said that typhoid had been thought a thing of the past, the death rate per 100,000 population having dropped from between 50 to 70 a half-century ago to 0.3 last year, a record reflecting great credit on the water works plants. The contemporary outbreak in the northern part of the state—251 cases and 13 deaths—had been caused by a milk company which, before a change in ownership, had used deficient care in the making of cheese.

*Wartime Plant Maintenance and Water Conservation:* F. H. Weed, Reg. Engr., W.P.B., told members how economic utilization of all materials and means in maintaining efficient operation in the many water systems throughout the country and conservative practice regarding expansion and development have helped greatly in smoothing the difficult chore of the W.P.B. Weed maintained a desk outside the auditorium to which plant superintendents and purchasing agents trekked the remainder of the day.

*New Water-Borne Disease Hazards of the Postwar Period:* Don E. Bloodgood, Assoc. Prof. of San. Engr., Purdue University, spoke on virus and pollution in water supplies, offering the opinion that diseases customarily attributed to tainted water are more frequently the result of other in-

(*Continued on page 48*)

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Prevent Sand Beds From Cracking
Eliminate Mud Balls
Save Wash Water
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Higher Rates of Filtration

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(*Continued from page 20*)

fection sources. He pointed out several health problems which might arise upon the return of soldiers from foreign battle fronts.

*Stream Pollution as It Affects Indiana Public Water Supplies:* Joseph L. Quinn, Jr., Exec. Secy., Indiana Stream Pollution Control Bd., told that out of the 333 water supplies in Indiana, 46 are surface supplies with 35 of the 46 subject to pollution. More than half of the population of the state is supplied from these 35 sources. Pollution of streams affects chiefly recreational facilities, fish life, and agricultural and horticultural pursuits, but no actual physical danger is as apparent to the population as that caused by a grossly contaminated water supply.

A motion picture, *Construction of the New Impounding Reservoir of the Indianapolis Water Co.,* was exhibited by William C. Mabee, Chief Engr. (Retired), and Claris Allen, Asst. Engr.

*Why License Water Works Operators:* This paper by P. S. Sikes, head of the Dept. of Governmental Research, Indiana University, will appear in the JOURNAL later this year.

J. E. KLEINHENZ
*For the Secretary-Treasurer*

(*Continued on page 50*)


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## DIAPHRAGM PUMPS

***Hand Operated--sizes 2", 2½", 3", 4"***
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***Open Discharge or Force Pump***
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**IN BELL & SPIGOT MAIN LAYING**

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# save what you have

## ....for Victory
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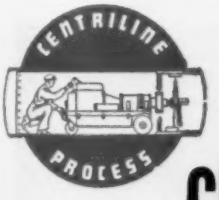
●Today the Centriline process of reconditioning water supply mains is playing a vital part in the war economy program of many a community. By insuring the maximum supply of water and increasing the longevity of pipelines, it offers a wise precautionary defense measure as well as a far-sighted business undertaking. If tests show a decrease in carrying capacity, if the city budget shows costly pumping expenditures—it's high time to Centriline. High time to recondition the interior of those water mains and provide an ever-smooth, non-corrosive, non-tuberculating surface which will permanently maintain a high coefficient and protect the underlying metal—whether steel or cast iron. It's the American way to go all out for Victory—and save what you have for today and tomorrow.

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restores and protects pipe-line carrying capacity

(*Continued from page 48*)

## REPORT OF THE NEW YORK SECTION MEETING

The Spring War Conference of the New York Section was held at the Hotel Utica, Utica, N.Y., on April 27–28.

The U.S. Bureau of Transportation had urged the limitation of meetings to those of a strictly essential type, but the Section decided that, in view of the several matters of importance prevailing in the New York Section, the meeting should be held as planned.

Postwar planning for water works was the keynote of the meeting. The general discussion was led by E. T. Cranch, Dir. of Public Works, New Rochelle, N.Y., and the main speaker was Holden A. Evans, Exec. Secy., N.Y. State Postwar Public Works Planning Com. Earle Devendorf, Asst. Dir., Div. of San., N.Y. State Dept. of Health, also presented a paper on the subject.

New York is one of the few states which has set up a fund to defray a part of the costs of plans and specifications for postwar work in the water works field. Many cities have already taken advantage of this aid.

Bayard F. Snow, Reg. Engr., Reg. 1, Water Supply Sec., Office of

(*Continued on page 52*)

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Check the Kupferle No. 100 series against your own check list for an ideal fire hydrant . . . they will check on every point.
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* For Section's representative on the A.W.W.A. Board of Directors, see list on page ii.
† Acting.
‡ Asst. Secy.-Treas.

(*Continued from page 50*)

War Utilities, W.P.B., Washington, D.C., discussed the W.P.B. and the water production business.

E. J. Rowe, Wellsville, N.Y., was chosen by the Section as recipient of the Fuller award, and the following citation was made:

> "For his pioneer leadership in stimulating group meetings of water works officials and his unstinting assistance to neighboring water works officials, thereby creating an example for group action during the war period in relation to the mutual aid program for water supply service."

ROLLO K. BLANCHARD
*Secretary-Treasurer*

**A rechargeable pocket flashlight battery** is promised to meter readers, watchmen, etc., in the beautiful postwar world by the Lead Industries Assn. It is the usual lead-acid storage battery, in a casing devised to prevent leakage, the factor which has hitherto kept storage batteries out of flashlights. In the newly designed battery, the plates and separators are so arranged that capillary attraction holds the liquid in its proper place, and shaking or tipping will not cause leakage.

(*Continued on page 54*)

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Standard—
"Traffic Model"—
Flush Type—
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Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit any Type Pipe.

Also—Floor Stands, Shear Gates—Tapping Sleeves and Valves, Flap Valves and Mud Valves.

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*The name that speaks Volumes on the Water-front*

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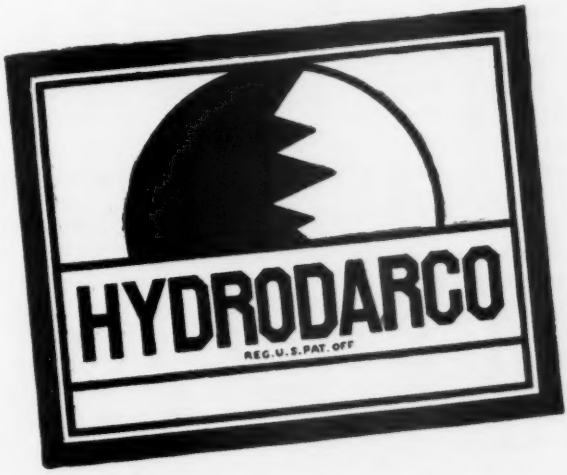


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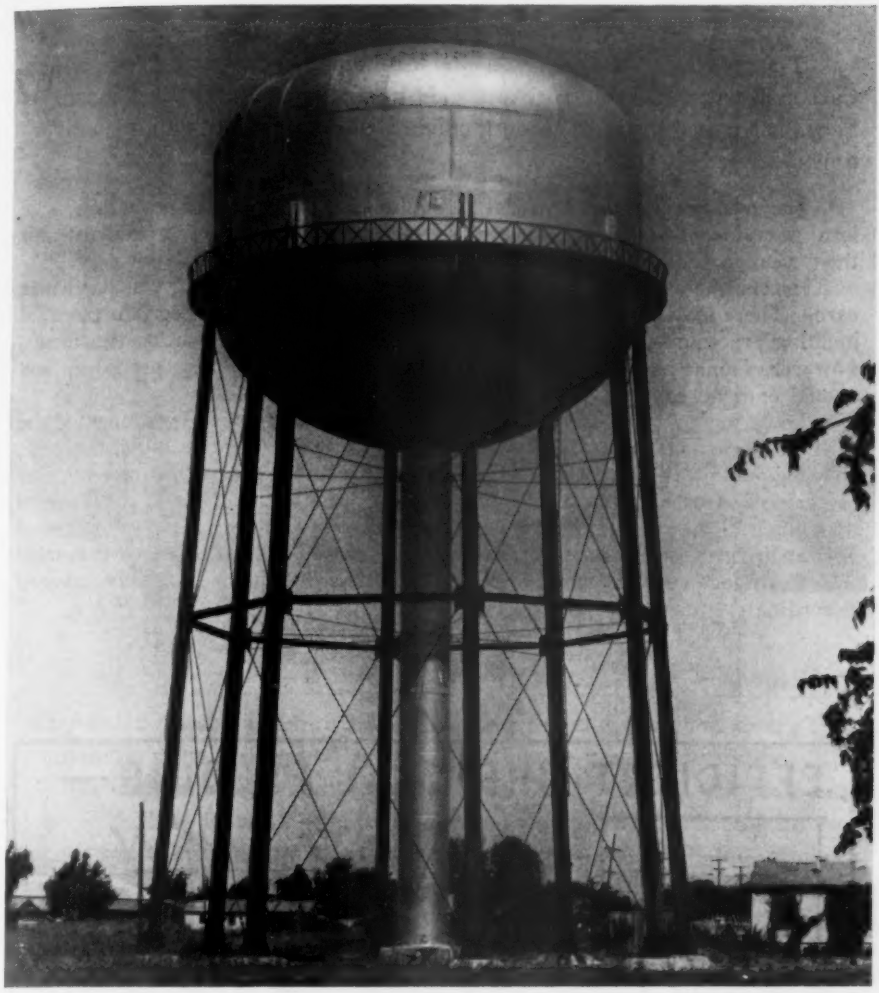
*Distributing Points:* New York Buffalo Cincinnati Chicago
St. Louis Kansas City San Francisco Los Angeles Marshall, Texas

(*Continued from page 52*)

**In a recent number of "Citizens' Business,"** the Philadelphia Bureau of Municipal Research tells the following story:

> Use by the city of measures developed through the advance of sanitary science has done much to improve municipal sanitation in Philadelphia. However, the city is still far short of doing all that is possible.
>
> An outstanding example of progress in municipal sanitation is the improvement of the city's water supply since 1902. In that year the city pumped its water, as it does now, from the polluted Delaware and Schuylkill Rivers, but, except for sedimentation in reservoirs, the disease-laden water was distributed just as it came from the rivers. Following 1902, the city began to filter and chlorinate its water, and by the end of 1913 the entire water supply was being filtered and chlorinated. The reduction in the death rate from typhoid fever, a water-borne disease, is an approximate measure of the benefit to health derived from these improvements. In 1906, before treated water was available throughout the city, the typhoid death rate reached 74.0 per 100,000 of population; in 1914 it was 7.5 per 100,000, while in 1942 it was only 0.4 per 100,000. However, the city is not nearly as safe as it should be. The water-treatment plants have been allowed to deteriorate, and until they are put in first-class condition the defenses against water-borne disease will not be secure.
>
> Municipal sanitation has been improved by the construction [of one sewage disposal plant] and of sewers to carry away the city's vast quantities of sewage. [However] . . . the city has much more to do before pollution of the rivers by its sewage will be completely abated through suitable treatment of the sewage discharged into the rivers.
>
> Present-day street cleaning is a big advance over the practice in the city's early days of throwing all kinds of refuse on the streets and allowing it to remain there. However, even now, some refuse is thrown on the streets, and the ideal of clean streets has not been reached. Also, while progress has been made through the enforcement of sanitary regulations in bettering the condition of tenements and other buildings a real-property survey made in 1939 revealed that 10.9 per cent of the occupied family accommodations in Philadelphia had inadequate sanitary facilities. Of the 491,602 families, 53,793 lacked private bathing facilities, 47,279 had no private inside toilet, and 1,040 had no running water in the house.
>
> While means for improving the sanitation of cities were being developed, the standards of municipal sanitation were rising. It is no longer sufficient that water be clear and abundant; it must also be healthful, odorless, and tasteless. Merely to collect and dispose of wastes such as garbage, ashes, and rubbish as conveniently as possible is no longer adequate; they must be collected inoffensively and neatly, and must be disposed of quickly and in a sanitary manner. However, as the standard is raised, approach to the standard is slower. Considerable improvement in an insanitary condition may be quickly effected, but the final elimination of the condition may be difficult and slow. Thus, when the typhoid death rate was high, it was reduced 66.5 per 100,000 of population by the improvements of 8 years. At the end of 28 more years, the typhoid death rate had declined only a further 7.1 per 100,000.

(*Continued on page 56*)



## TWO TANKS ARE BETTER THAN ONE!

When the California Water Service made plans for improving distribution pressures in their system serving Stockton, Calif., they found that two elevated tanks, one in the eastern section and one in the southern section of the city, would be better than a single installation at a central location. The structures are identical twins—ellipsoidal-bottom tanks with ellipsoidal roofs, 500,000 gals. capacity, 60 ft. 7 in. to bottom.

**CHICAGO BRIDGE & IRON COMPANY**

BIRMINGHAM CHICAGO WASHINGTON
PHILADELPHIA NEW YORK CLEVELAND
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(*Continued from page 54*)

**The National Committee on Municipal Accounting,** of which Carl H. Chatters, Exec. Dir. of the Municipal Finance Officers Assn., is Secy., has issued a statement on municipal accounting and auditing in wartime. It reads:

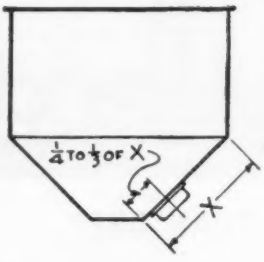
The members of the National Committee on Municipal Accounting urge local government finance and accounting officers to maintain high standards for their accounting, auditing, and reporting procedures during wartime.

Internal auditing of receipts and disbursements should be given particular care. There may be temptations to use short cuts, to eliminate certain essential auditing procedures, or to permit lax auditing methods. Any such adjustments, however, should harmonize with accepted standards of auditing procedure and should omit no essential checks.

Lowering of standards may come about because of new personnel or the absence of capable supervision. Officials will do well to bear in mind, however, that the public will not accept the war as an excuse for poor work once the war has ended. Consequently, public officials who want to retain their professional standing and protect the governments they serve must make every effort to see that auditing procedures are adequate. In cases where the absence of personnel make satisfactory auditing impossible, the governing body should be advised accordingly.

(*Continued on page 58*)

EFFICIENT CHEMICAL FEEDING—

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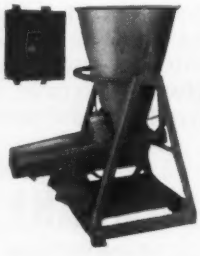
With adjustable power on those troublesome storage bins and auxiliary hoppers to keep their contents agitated and free-flowing.
Little 4 lb. models—up to big 500 lb. sizes.



A SYNTRON
DRY CHEMICAL FEEDER MACHINE
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Under those storage bins and auxiliary hoppers.
With calibrated rheostat control of the rate of feed.
Electric Vibrators on the supply hoppers.
Built-in solution pots.
Choice of Cabinet or Open type machines—dust sealed if desired.
Capacities of from OUNCES to TONS per hour.

Write us about *your* dry chemical feeding problems
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# STOP DIGGING THEM UP

Why get a gate valve that has to be dug up and replaced every time something goes wrong? That costs plenty in time and money. End all this nuisance by installing MUELLER-COLUMBIANS on your next job . . . Here is a gate valve that is so designed that it can be serviced while still in the line. No digging up—ever. If the packing needs replacing, it can be quickly done at any time regardless of whether the valve is open or closed. No interruptions to service, either. If the discs or seat rings need checking or periodic cleaning this can be readily done as the entire gate assembly comes out as a unit . . . However, you will find service calls rare on MUELLER-COLUMBIAN gate valves. Bronze is generously used to prevent trouble-making rust. The ball-joint follower on the packing gland assures a leak-proof packing without binding the stem. The four-point wedging mechanism prevents sprung discs. As a final check, each valve is hydrostatically tested to twice the indicated working pressure. These assure a smooth working valve under all conditions. Eliminate digging up. Get MUELLER-COLUMBIANS and save time and money.

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A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.

Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 56*)

Local governments should continue to prepare and publish financial reports, even though the published reports may be reduced to summary statements only. Complete and detailed financial reports, even though not published in full, should be made, carefully bound, and preserved in the public offices. Finance officers who fail to prepare complete reports will break the continuity of information about their governments, thus making it difficult to formulate financial plans. Some local governments tend to put more detail than necessary in their printed reports. While this detail is necessary for internal use, much of it may be omitted from printed reports. But reports in summary form should be published regularly.

Some municipal accounting and reporting systems require unnecessary work. The war provides a background for eliminating unnecessary procedures which may have been built up over a long period of years. The shortage of labor and materials make it advisable to survey carefully the nature and extent of accounting work and retain only those features which serve some useful purpose.

The Committee believes that unusual problems exist with respect to the handling of public payrolls. Since most of the money spent by public bodies is paid out for personal services through the payrolls, these documents and the timekeeping records back of them deserve more careful consideration. The Committee recommends that all payments be made by check, that no checks be given to foremen or department heads, and that each employe be given or mailed his own check by some person independent of the person or department for which he is working directly. In view of the added work caused by application of Federal withholding taxes, local governments may well reconsider the question as to whether payroll deductions for private purposes can be continued.

In the period immediately following the war, there will be a great expansion of accounting by machine methods. Whenever it is possible to do so, the responsible accounting officials should be studying their accounting procedures now so that they will be ready to install the accounting equipment which they cannot obtain during the war period. Much accounting work is being done by hand methods, or by inefficient machine methods, that can properly be converted when machines are again available. Cities should be prepared to make the reconversion period after the war also a period of reconstruction in which the benefits of improved procedures and equipment can be realized.

(*Continued on page 60*)

***PREVENT WEAR AND CUTTING of rods, plungers and shafts by using***

Trade Mark MABBS Reg. U. S. Pat. Off.

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**An Ideal Packing for Water Works and Sewage Pumps and Valves**

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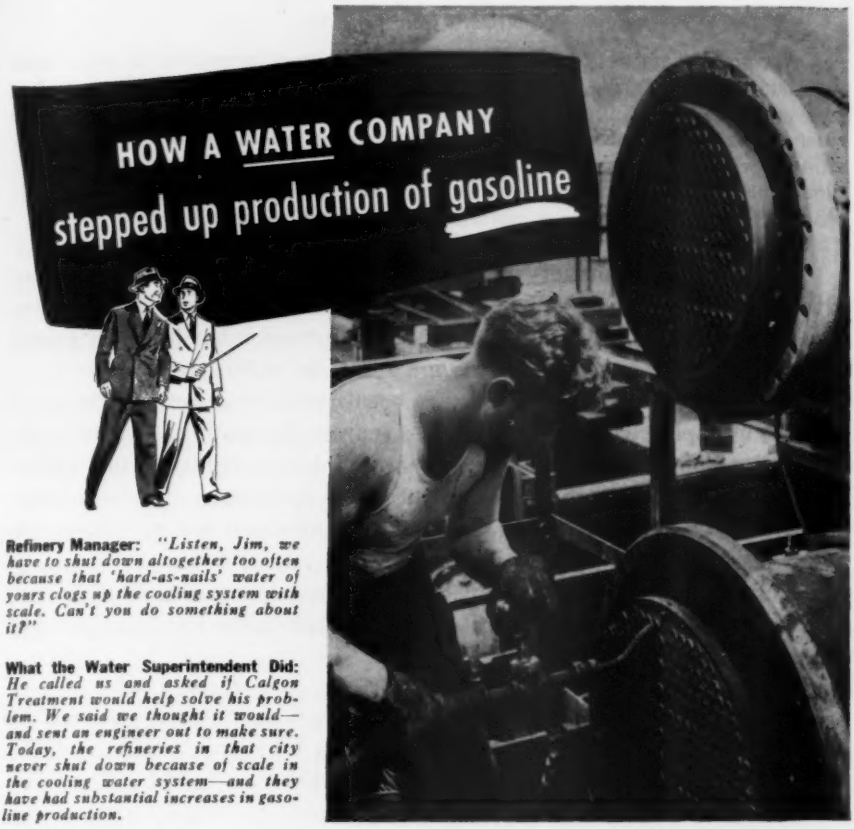


**Refinery Manager:** *"Listen, Jim, we have to shut down altogether too often because that 'hard-as-nails' water of yours clogs up the cooling system with scale. Can't you do something about it?"*

**What the Water Superintendent Did:** *He called us and asked if Calgon Treatment would help solve his problem. We said we thought it would—and sent an engineer out to make sure. Today, the refineries in that city never shut down because of scale in the cooling water system—and they have had substantial increases in gasoline production.*

CALGON is one treatment that will control corrosion, prevent scale, eliminate "red water" or stabilize water after lime-soda softening. *No new problems are introduced as a result of Calgon Treatment!*

Only 0.5 to 10 ppm. Calgon are needed to accomplish any of these effects. This keeps the cost extremely low. You can start Calgon Treatment immediately. No waiting for elaborate equipment. Only a simple feeding mechanism is required.

Industrial plants need never shut down because of scale in heat exchangers and condensers. Home owners need never suffer with clogged-up water heater coils. In Calgon* you have a treatment that will keep industrial and domestic equipment operating in A-1 condition. Get the facts now.

*Calgon is the registered trade-mark of Calgon, Inc., for its glassy sodium phosphate products.*

## Calgon solves 4 water works problems

1. **Prevention of scale** from hard, high-bicarbonate waters. Calgon, added at the plant, prevents scale formation in mains, meters and hot-water heaters, throughout the system.

2. **Corrosion control**—Calgon forms a thin protective film on metals and metal oxides at pH values of 5.0 and higher. This reduces the attack of oxygen to such an extent that corrosion ceases to be a problem.

3. **Prevention of "red water"**—Calgon prevents the precipitation of dissolved iron. Thus "red water," either from iron initially present in well water, or from corrosion, can be eliminated.

4. **Stabilization of water** following lime or lime-soda softening. Calgon's ability to prevent precipitation of calcium carbonate stabilizes water to the ends of the system.

HAGAN HALL BUROMIN CALGON

calgon, inc.

A SUBSIDIARY OF HAGAN CORPORATION

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(*Continued from page 58*)

Accounting and reporting procedures are designed primarily to assist with the management of government. Consequently, during periods of stress when new problems are continually appearing, the financial reports and procedures must be planned to meet the needs of government administrators. When conditions are changing as rapidly as they are now, the form and content of reports should be continually scrutinized to make certain that they accomplish their proper objectives in the most efficient and thorough manner.

**The American Society for Metals** is providing an annual fund of $1000 for the support of fundamental researches in the field of corrosion. The American Co-ordinating Committee on Corrosion has been designated to receive and approve applications for grants from this fund.

A Subcommittee on Research has been named to select such research projects as appear worthy of support, to approve the qualifications of applicants for grants-in-aid from the research fund, and to certify to the American Society for Metals the names of successful applicants. The grants-in-aid will vary from $250 to $1,000, the total allocated not to exceed the latter amount in any one year.

Further information is obtainable from the sub-committee's chairman, Dr. R. M. Burns, Asst. Chemical Dir., Bell Telephone Laboratories, 463 West St., New York, N.Y.

**"Modern pH and Chlorine Control"** is a completely revised 83 page combination handbook and catalog (6th ed.) now available gratis from W. A. Taylor & Co., 7300 York Rd., Baltimore 4, Md. Contained in the first 50 pages are: (1) a simple, non-technical explanation of the meaning of pH control and the methods for making colorimetric determinations; (2) a listing of precautions to be observed; (3) a discussion of the application of pH and chlorine control to 31 different fields, including water purification and softening, sewage disposal boiler water, etc.; (4) a technical discussion of the meaning of pH control. The remaining 33 pages are devoted to descriptions of various types of Taylor Slide Comparators.

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# NEWS OF THE FIELD

**The city of Milwaukee played host** to the Association's Third "Conference on War-Winning Water Works Operation," its 64th Annual Convention, on June 13–16. With traveling more difficult than in any previous war year, nevertheless 1356 people registered.

Milwaukee, which last entertained the water works men of the nation in 1909, exhibited to those in attendance at the Conference its new water purification plant, which was put into operation 5 years ago. Joseph P. Schwada, Milwaukee's Chief Engr., opened the convention with a description of the design and construction of the new plant. This talk was part of the Plant Management and Operation Division Session, which was presided over by Frank C. Amsbary Jr. and was followed by further discussions of Milwaukee's water supply by Herbert H. Brown, Milwaukee Water Works Supt., and Harrison B. Hoefer, Chief Engr. of Power Plants.

As is the usual custom, there were two or three sessions held each morning and afternoon, keeping members of every interest and bent busy at all times. Men were in Milwaukee on serious business and proved their intentions by their unflagging interest in technical meetings and in the technical exhibits, arranged by water works manufacturers.

At the Cleveland Conference a year ago, the national and regional officers of the Office of Civilian Defense held a meeting. This year there was a meeting of Corps Area engineers and Army camp maintenance and repair officers who deal with water supply problems in Army training areas. It was held under the direction of Maj. B. A. Poole of the Off. of Chief of Engr., Repairs and Utilities Branch, War Dept., Washington, D.C.

Postwar planning was discussed at a general meeting held in the evening of the second day, presided over by Malcolm Pirnie, Pres., American Society of Civil Engineers, and Past Pres., A.W.W.A. Edward Falck, Dir., Off. of War Utilities, W.P.B., defined the program and policies of his bureau and Col. Wm. N. Carey of the Federal Works Administration covered postwar construction from the point of view of the federal government. A. M. Rawn, Pres., Federation of Sewage Works Associations, and Chairman, A.S.C.E. Committee on Employment Conditions, spoke at the same meeting on labor organization in the professional and municipal fields.

The Plant Management and Operation Division held a second meeting in conjunction with the Finance and Accounting Division, at which Lt. Col. Harold B. Gotaas, Acting Dir., Institute of Inter-American Affairs, described management and control of public water supply services in other American republics.

(*Continued on page 2*)

(*Continued from page 1*)

The Finance and Accounting Division, with A. P. Kuranz as Chairman, held a meeting at which a symposium on wartime problems of jointly administered water and sewage works was led by Leonard N. Thompson, A.W.W.A.'s new Vice-Pres.

There were three other general sessions: one on costs and depreciation, with a final committee report on survival and retirement by E. H. Aldrich; another on finance and the legal aspects of utilities operation, with a report on the program and policies of the Water Division of the Office of War Utilities, by Arthur E. Gorman, its Chief; and a third on postwar planning, at which E. L. Filby, Field Dir., summarized the promotional work accomplished by the Committee on Water and Sewage Works Development.

Three sessions of the Water Purification Division, led by A. Clinton Decker, drew large crowds. The Water Works Practice Committee, under Malcolm Pirnie, reviewed progress made by its various sub-committees, while the Ground Water Supplies Committee, with J. Arthur Carr and James Harding, jointly presiding, discussed deep wells, deep well pumps, and the *U.S.P.H.S. Sanitation Manual for Ground Water Supplies.*

The Steel Pipe Committee, with Wm. W. Hurlbut in the chair, discussed wartime use of steel pipe and displayed a color-sound motion picture of the Dixie Pipe Line.

As in years past, enthusiastic interest in the various cups and prizes awarded by the Association was evinced.

The Nicholas S. Hill Jr. Cup, which is annually awarded to the Section with the greatest percentage gain in membership, was won by the Florida Section. Second place was attained by the Southwest Section. In third place was the Virginia Section. Their comparative scores were: 48.08, 40.68, and 34.63.

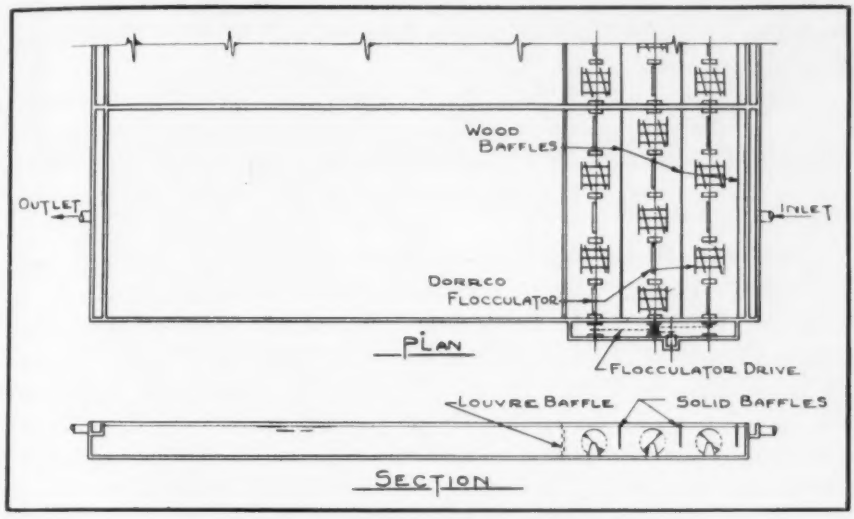
The Old Oaken Bucket is still in the hands of the California Section, which leads the Sections in total membership with 644.

The Minnesota Section won the Henshaw Cup, as the Section having the greatest percentage of its members in attendance at its Section Meeting. In second place was the Montana Section, which attracted 62.26 per cent, as compared to the winner's 69.60 per cent. Third place was taken by the Pacific Northwest Section, with 55.85 per cent.

These men were made Honorary Members of the Association: Charles B. Burdick, Hydr. and San. Engr., Chicago, for his contributions to the economic development and administration of public water supplies; Frank E. Hale, Chemist, Brooklyn, for his research and practice in the field of water examination and for his many contributions to the literature of water quality control; and Thomas H. Wiggin, Cons. Engr., New York, for his contributions to safe water supply and to the lengthened useful life of water works distribution systems.

(*Continued on page 4*)

# MODERNIZE YOUR WATER PRETREATMENT PLANT WITH DORRCO FLOCCULATORS




Dorrco Flocculator in Sedimentation Basin

● IT is a comparatively simple and inexpensive matter to install Dorrco Flocculators in plain or mechanically cleaned sedimentation tanks thereby effecting many benefits and economies.

The savings in chemicals and filter operation alone will amortize the installation cost of the Flocculators in a short time. In addition the flocculated water is better conditioned for filtration, giving longer filter runs with less back washing, and increasing the capacity of the plant. Also mud balls are eliminated.

These facts have been definitely proved by records at the Trenton, N. J., plant, where two plain settling basins, one equipped with a Dorrco Flocculator, and the other without, were operated side by side for about a year. During this period approximately $3000 was saved in the consumption of alum and lime in the flocculated tank and the length of filter runs was boosted 50%. As a result of this trial, the entire plant was equipped with Dorrco Flocculators.

A Flocculator alone in a settling tank is a great advantage but for most efficient results it should be combined with a Dorrco Flash Mixer. The further addition of a Dorr Clarifier mechanism puts the removal of sludge on an automatic basis.

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(*Continued from page 2*)

The John M. Diven Memorial Award was bestowed on Louis R. Howson, Cons. Engr. of Chicago and Past Pres., A.W.W.A., for "his many services and valuable contributions to the advancement of the water works field . . . Along with [giving efficient leadership] he has found time to record valuable personal experiences for the guidance of men in the water works field in many papers delivered at A.W.W.A. General and Section Meetings."

Noel S. Chamberlin and John R. Glass won the John M. Goodell Prize for their papers on "Colorimetric Determination of Chlorine Residuals," deemed the most valuable articles to appear in the JOURNAL during the past year. They were published in the August and September 1943 issues.

Recipients of the Fuller Memorial Awards, listed by Sections, were: George W. Pracy, California; William Storrie, Canadian; Frederic A. Eidsness, Florida; L. L. Hedgepeth, Four States; Winfred D. Gerber, Illinois; Edward F. Kinney, Indiana; Louis B. Harrison, Michigan; Daniel H. Rupp, Missouri Valley; David S. Thomas, Montana; Attmore E. Griffin, New Jersey; Ernest J. Rowe, New York; William McK. Piatt, North Carolina; Philip Burgess, Ohio; Fred Merryfield, Pacific Northwest; Dwight D. Gross, Rocky Mountain; Fletcher K. Ellis, Southeastern; Leslie A. Jackson, Southwest; Robert C. Bardwell, Virginia; John N. Chester, Western Pennsylvania; Joseph K. Buchanan, West Virginia; and Herbert H. Brown and Joseph P. Schwada, Wisconsin.

**Samuel F. Newkirk Jr.** took office in Milwaukee as the 1944–45 President of the A.W.W.A. Newkirk, who has been an engineer for over 30 years, and an active participant in A.W.W.A. affairs for 17 years, succeeds Samuel B. Morris, under whom he has served as Vice-President for the past 12 months.

Newkirk has been Engr. and Supt. for the Bd. of Water Comrs. of Elizabeth, N.J., since 1931. Prior to that he was Supt. and Engr. for the privately-owned Elizabeth Water Works, the Elizabethtown Water Co. Consolidated, for 4 years and Engr. with the Natl. Bd. of Fire Underwriters in New York for 6 years. An alumnus of the Pennsylvania State College, class of 1913, he commenced his career as an engineer with the Mercer Iron & Coal Co., Stoneboro, Pa., and later was associated with L. V. Metz, Cons. Engr., Erie, Pa. From 1915 to 1918 he was in the Eng. Dept. of the Town of Montclair, N.J., and later was associated with C. H. Watson, Cons. Engr., Great Neck, N.Y. In 1918–19 he was with the Air Nitrates Corp., Muscle Shoals, Ala., and then for 2 years was associated with Nicholas S. Hill Jr., Cons. Engr., New York.

Newkirk headed the New Jersey Section, A.W.W.A. in 1935–37 and was A.W.W.A. Dir. from the Section for the period 1939–41. He served

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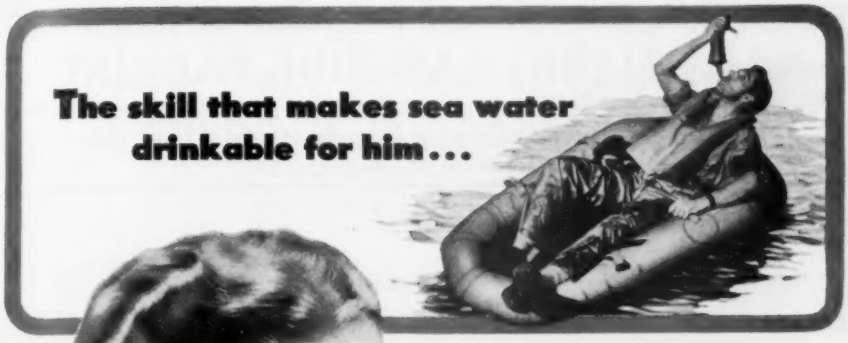

. . . can give your entire city a soft, sparkling water supply

LATEST example of Permutit's service to our country at war is the kit which takes the salt out of sea water to keep alive our flyers forced down at sea. After the war Permutit's long experience in water treatment will help to build a happier, healthier America. For instance, recent developments by Permutit* make it more practical and economical than ever for municipalities to enjoy good water supplies—free of hardness, dirt and iron.

Many cities have put good water at the top of their lists of post-war improvements. Plan it now for *your* community! Write for full details to The Permutit Company, Dept. G2, 330 West 42nd St., New York 18, N. Y. In Canada: Permutit Company of Canada, Ltd., Montreal.

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*PREVENT WEAR AND CUTTING of rods, plungers and shafts by using*

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**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**

(*Continued from page 4*)

as Dir. of the Plant Management and Operation Div. in 1939–40. He was rewarded for his work as Chairman of the Committee on Meters with the John M. Diven Medal, and the New Jersey Section cited him for the Fuller Award in 1943. He has also served the Association as a member of the Executive Committee, the Convention Management Committee and the Committee on Municipal Water Works Organization.

**Leonard N. Thompson,** Gen. Supt. and Engr., St. Paul, Minn., Water Dept., is the A.W.W.A.'s new Vice-President. Thompson has been a member of the A.W.W.A. since 1929, and has participated in Association affairs as Chairman of the Minnesota Section, and Dir. for the Section in 1937–39. He is Chairman of the Committee on Joint Administration and Collection of Water and Sewer Accounts.

Thompson was born in St. Paul on June 27, 1888, and graduated from Ripon College, Ripon, Wis., in 1911. He was first engaged as Engr. on the Omaha Railway, and was Engr. with the St. Paul Water Dept. from 1912 to 1917. He was Designing Engr., with the U.S. Air Service in Washington, D.C., at the close of the last war, and thereafter was with the St. Paul Water Dept. Between 1921 and 1928 he was Designing and Constr. Engr. in charge of the filter plant, softening plant, reservoirs, supply conduits, etc. Since then he has been in charge of the Department.

(*Continued on page 8*)

ZECO GREENSAND ZEOLITE

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

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## Employs MIXING & FLOCCULATION Facilities

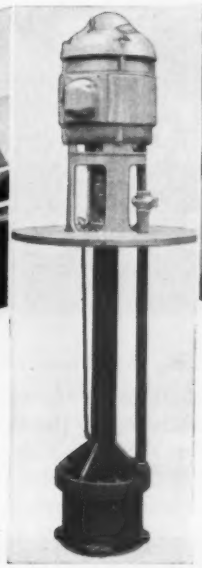
as separate functional units consisting of

- ***Mixing*** by violent turbulence for intimate dispersion of small quantities of chemicals

- ***Flocculation*** by mild turbulence for a definite period prior to sedimentation

RAPID MIX

Large volumes of water at extreme turbulence



FLOCCULATION

Large volumes of water at low velocities

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*Why not take time off and write a letter to the fellows in the service.*

They would rather have a letter from you than money from home.

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**Bring in a New Member**

HELP PROMOTE YOUR ASSOCIATION BY INTERESTING YOUR FRIENDS AND CO-WORKERS IN IT.

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**American Water Works Assn.**
500 Fifth Avenue, New York 18, N. Y.

(*Continued from page 6*)

**Maj. B. A. Poole,** Chief San. Engr. on leave-of-absence from the Indiana State Bd. of Health, has been transferred from the post of Reg. San. Engr. of the 6th Service Command, Chicago, to the Off. of Chief of Engr., Repairs and Utilities Branch, War Dept., Washington, D.C. Maj. Poole is now in charge of all water and sewerage plants operated by the Army in the continental limits of the U.S. Maj. Poole entered the Sanitary Corps as Captain in the summer of 1942.

**Maj. Ross A. Thuma, C.E.,** has retired, and has returned to his civilian position as Supt. of Water Filtration and Softening, St. Paul, Minn. While in service, Maj. Thuma was assigned to special problems of water treatment, especially the control of scale and corrosion in water systems, in the Headquarters of the 7th Service Command, Omaha, Neb., and subsequently was Post Engr. at Ft. Des Moines, Iowa.

**Maj. Rolf Eliassen, C.E.,** who has been in charge of sanitation work in the New York area since 1942, was transferred in May to Ft. Douglas, Utah, where he is assigned to the 9th Service Command Engr. as

(*Continued on page 10*)

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THAT CUTS COSTS

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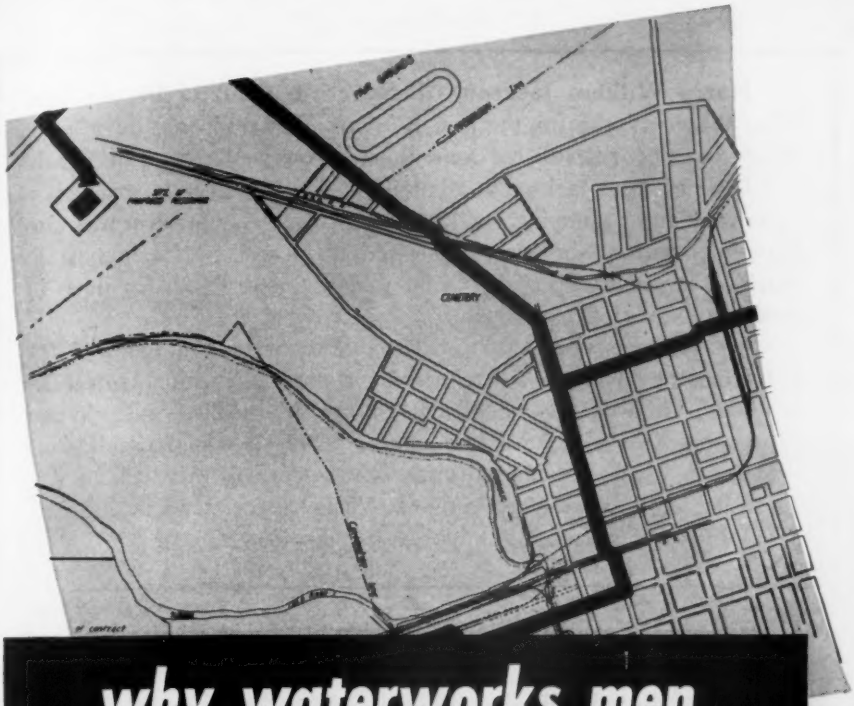


# why waterworks men are modernizing on paper

War years have a way of "doing things" to even the best-planned waterworks systems. Cities and towns often change radically; needed improvements are postponed because of the vital need for war materials.

This is why many superintendents are *planning now* for peacetime projects. Not only will waterworks systems require overhauling, but returning war veterans will want to get back on the job immediately.

In planning these blueprints of the future it will pay you to consider the practical advantages of ARMCO Spiral Welded Pipe. When designing with this pipe you can select the correct wall thickness, diameter, joints, fittings and accessories. Properly used, this sturdy pipe will give you many years of economical and efficient operation.

Before designing your new or improved systems for postwar service, write us for complete data on ARMCO Spiral Welded Pipe. It meets standard A.W.W.A. specifications. Just address The American Rolling Mill Co., 2361 Curtis St., Middletown, O.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

**ARMCO STEEL PIPE**

**MEETS A.W.W.A. STANDARD SPECIFICATIONS**

(*Continued from page 8*)

**Harry William Jackson,** 61, Superintendent of the Antigo, Wis., Water Works for the past 27 years, died suddenly on May 6. Although in poor health for some time, he was active until his death.

During Mr. Jackson's administration, Antigo constructed a water tank and a pumping and filtration plant. Mr. Jackson was also Superintendent of the sewage disposal plant and system, a post in which he succeeded Frank K. Quimby, now Construction Engineer in the Racine, Wis., Water Dept.

Mr. Jackson graduated from Armour Institute, Chicago, in 1900, and from the Mechanical Engineering course at Purdue University in 1904. He was Superintendent of the Platteville, Wis., Water Works and then of the Wausau, Wis., Water Works from 1907 to 1911. In 1911 he established a laundry in Antigo, in which he was interested until he became Antigo's Water Superintendent in 1917.

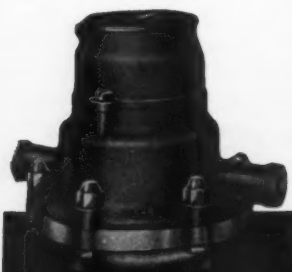
Mr. Jackson was an A.W.W.A. member for 20 years.

officer in charge of the San. Eng. Sec. He has supervision of the operation of all water systems and sewage treatment plants at Army posts west of the Rocky Mt., in an area covering the 8 western states. Maj. Eliassen was Assoc. Prof. of San. Eng. at New York University before entering the Service.

**Arthur D. Caster,** formerly associated with Charles H. Hurd, Cons. Engr., is now San. Engr. with the Sanitary Facilities Unit, Repairs & Utilities Branch, Hq., 5th Service Command, Fort Hayes, Columbus, Ohio. He was for 14 months previously San. Engr. at Camp Atterbury, Ind. While associated with Hurd, Caster worked on design and construction of Camp Atterbury.

(*Continued on page 12*)

**NIAGARA IRON CASE WATER METERS**



provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

**WRITE FOR CATALOG.**

**BUFFALO METER COMPANY**
Established 1892 2914 Main St., Buffalo, N. Y.

SOFT WATER
IN EVERY ONE!
Soft, iron-free water, clear and sparkling, from every faucet in every home means cleaner washes, easier household cleaning, more luxurious bathing, and remarkable savings on soap and plumbing repairs. Every home, yes, and every industrial plant, too, will welcome soft water after the war.
Refinite offers a complete line of water conditioning equipment. Let Refinite discuss YOUR city's water problem with you, and furnish quotations and recommendations. There is no obligation. Write for free Catalog.
The Refinite Corporation
Write for Free Catalog—108 Refinite Bldg., Omaha 8, Nebr.

(*Continued from page 10*)

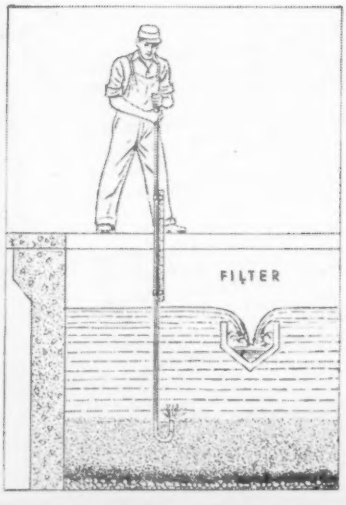
**W. M. Franklin,** of Charlotte, N.C., Dir., North Carolina Sec., A.W.W.A., has been commissioned a Captain in the Army, and is now in charge of the Sanitation Branch of the Engineers Post, Camp Shelby, Miss. His province covers water, sewage, garbage, refuse, mosquito control, flies, vermin, and, he says, "everything that crawls or walks or flys or flows."

**Capt. Paul W. Reed,** Sr. San. Engr. on leave-of-absence from the Bur. of San. Eng., Indiana State Bd. of Health, has succeeded Maj. B. A. Poole as assistant on sanitation to the 6th Service Command Surgeon, Chicago, Ill.

Capt. Reed, who graduated from Purdue University in 1937, entered the Service in April 1942 as 1st Lt. in Field Artillery. In November 1943 he was detailed to the Sanitary Corps and sent to the Medical Field Service School at Carlisle Barracks, Pa., and then to the Chemical Warfare School at Edgewood Arsenal, Md. His first assignment was as Sanitary Officer at Camp McCoy, Wis., and he was transferred from there to Chicago on May 1.

(*Continued on page 14*)

**MEASURE SAND EXPANSION WITH A LIGHT**

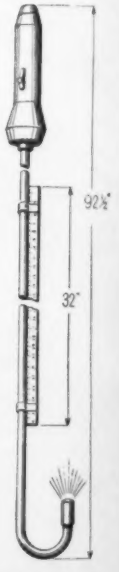



BUILDERS *Hook Light*

**SAND EXPANSION GAUGE**

**A novel and accurate means for determining sand expansion during back washing of filter beds. Amount of expansion, accurate to within 1/16", is read directly on scale without reference to water temperature or size of sand grains. For Bulletin 348 address Builders-Providence, Inc. (Division of Builders Iron Foundry), 9 Codding St., Providence 1, R. I.**

**"BLUE PRINT NOW"**




**BUILDERS-PROVIDENCE**

YOUR WATER PIPE PROJECTS ARE CRYING FOR ACTION!
Plan Now to Install
ALCO ELECTRIC WELDED STEEL PIPE
You'll want ALCO Electric Welded Steel Pipe because it's *strong*
—Because it is *smooth*—assures maximum capacity
—Because its *long lengths* assure minimum joints, rapid installation
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—And because it is widely known, widely used, is *thoroughly dependable* for vitally important water, gas, oil and sewer lines.
Make your plans now to get the ALCO Electric Welded Steel Pipe you will want. Line up your requirements—and tell us, so that your project will get precedence just as soon as restrictions are lifted.
American Locomotive
ALCO PRODUCTS DIVISION
30 Church Street, New York 8, N. Y.
Dunkirk, N. Y.
Buy War Bonds
5th War Loan

(*Continued from page 12*)

**Lt. Comdr. Norman C. Estes** of Houston, Tex., was killed in action in the Southwest Pacific on Nov. 13, 1943. He was serving as Commanding Officer of the 5th Naval Construction Battalion [Seabees].

Comdr. Estes was born in New Bedford, Mass., in 1906. He received an engineering degree from Massachusetts Institute of Technology in 1929 and the next year joined the Wallace & Tiernan Co. At the time of his entrance into the Navy as a Lieutenant, he was District Manager of Wallace & Tiernan's Houston sales office.

**Richard F. Edwards,** former Deputy County San. Engr. of Franklin County, in Columbus, Ohio, has gone to the Naval Air Station at San Diego, Calif., as Mech. Engr.

**Homer S. Yetman,** Western Representative of the Metallic Lead Products Div., Lead Industries Assn., has been placed in charge of that

(*Continued on page 16*)

**CYANAMID**

*Sulphate of Alumina*

CYANAMID through the control of its basic raw materials can assure you of a uniform high quality product at all times.

It assists in the removal of taste and odor.

It is and remains free flowing.

It is less corrosive than other coagulants.

It does NOT clog the dry feed machine.

It precipitates over a much wider pH range than other coagulants.

Your inquiry is invited on CYANAMID quality Sulphate of Alumina.

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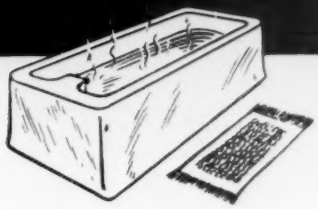
DISTRICT OFFICES: Boston, Mass.; Philadelphia, Pa.; Baltimore, Md.; Charlotte, N. C.; Cleveland, Ohio; Chicago, Ill.; Kalamazoo, Mich.; Detroit, Mich.; St. Louis, Mo.; Azusa, Calif.

# If 130,000,000 Americans took a Bath on the same Saturday Night!



***To say the least,*** **it would be a strain on the drain!**

**Seriously though, the problem of adequate pure water supply in the present, and in the future with possible population shifts and industrial readjustment, is one which concerns all of us who are associated with the water and sewage fields.**

**So much has been said of "Blueprint Now" that unless we are all on the alert, the facts which this slogan expresses may be lost. And if they are lost, many of us may face a hectic post war existence.**

**As a manufacturer whose effort is centered around the problem of sanitation, Simplex Valve and Meter Company is not interested in "force feeding" anyone into buying before he needs to buy; our interest is in extending to you the full facilities and experience of our company toward the end that your planning will be simplified and completely to your desires. Don't hesitate to get in touch with us.**

***Write today for further information and details of installation of Simplex "TG" Insert Venturi Tubes.***

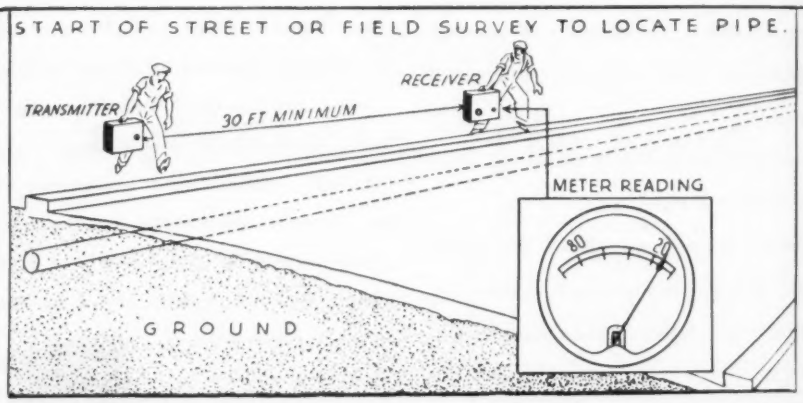
**SIMPLEX VALVE & METER CO.**
**6784 UPLAND STREET, PHILADELPHIA 42, PA.**

(*Continued from page 14*)

division's activities in the construction field for the entire country. His headquarters have been transferred from Tulsa, Okla., to the association's New York office. Prior to joining the Lead Industries Assn. 6 years ago, Yetman was Chief Plumbing Inspector of Tulsa.

**Lt. Marion G. Stewart, CEC-V(S), USNR,** former Supt. of the Natchez, Miss., Water Works, is attached to the Naval Air Primary Training Command at Glenview, Ill., as Asst. Public Works Officer. He administers and inspects public works at the Naval Training Air Fields in the Command Area. Lt. Stewart was commissioned last September and took 3 weeks of basic indoctrination preparatory to Seabee service before he was transferred to a 4-week course of public works instruction. In December and January he was posted at the Naval Operating Base, Norfolk, Va., and then went to Fairfax Airport, Kansas City, Kan., for duty in the Naval Air Primary Training Command. The entire Command was moved on July 1 to Glenview.

(*Continued on page 18*)


**M-SCOPE— BURIED PIPE AND CABLE FINDER**

***Exclusively manufactured by the Fisher Research Laboratory***

The M-SCOPE quickly locates the exact position of underground pipe-lines, bends, dead-ends, valves, cast iron bells, stubs, marble obstructions, etc. It determines depth of a pipe-line or metallic conductor. Traces exact course of underground line. It eliminates needless digging and tearing up—saves labor, materials and time.

Write to the Fisher Research Laboratory for latest 16-page booklet explaining the above method.

Please place your order *now* for immediate delivery from our Palo Alto, Calif., or Chicago, Ill., warehouses.

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FULL PRODUCTION for the boys
We at % Proportioneers, Inc. % are pleased to help our fighting men by building water purification units to protect their health wherever they fight—from the arctic to the tropics.

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CAUSTIC
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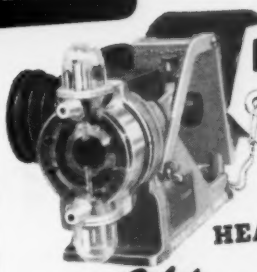
SULPHURIC ACID
AQUA AMMONIA
ALUMINUM SULPHATE, ETC.



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HEAVY DUTY MIDGET

*Chlor-o-Feeder*

Increased production enables us to offer the well known "Little Red Pump" for immediate shipment from stock on priorities of AA5 or better. This motor driven Chlor-O-Feeder is a constant rate, manually adjustable diaphragm type pump suitable for injecting against low or high pressures up to 85 lbs. per square inch. Capacity variations up to 6½ gallons per hour are obtained with a 3 step cone pulley and belt drive, and stroke length adjustment cam.

In addition to hypochlorite feeding at thousands of civilian and military water and sewage plants, the Heavy Duty Midget Chlor-O-Feeder is also used for the accurate feeding of many other chemicals.

% PROPORTIONEERS, INC. %

*"Chemical Feeder Headquarters"*

61 CODDING ST., PROVIDENCE 1, R. I.

(*Continued from page 16*)

**Adolph Mueller,** 78, Chairman of the Board of the Mueller Co., Decatur, Ill., died at his winter home in Miami Beach, Fla., on May 14. Mr. Mueller served as President of the Company from 1902 to 1938, at which time he was succeeded by his son, William E. Mueller.

Mr. Mueller was the last surviving one of six brothers taken into the firm by their father, Hieronymous Mueller, who founded the Company in 1860. The elder Mueller was inventor of a device for tapping water mains without turning off the water.

Adolph Mueller studied mechanical engineering at the University of Illinois, and held several patents on plumbing and water fixtures of his own invention.

The Mueller Co. is one of the five oldest Associate Members of the A.W.W.A., having been admitted in March 1882 and appearing on the Association's first roster to include manufacturers' names.

(*Continued on page 20*)


# SAVE FOR VICTORY

**EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.**

***Now is the time to do your part—SAVE FOR VICTORY***

## National Water Main Cleaning Co.

**30 Church St., New York, N. Y.**

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115 Peterboro St., Boston, Mass.
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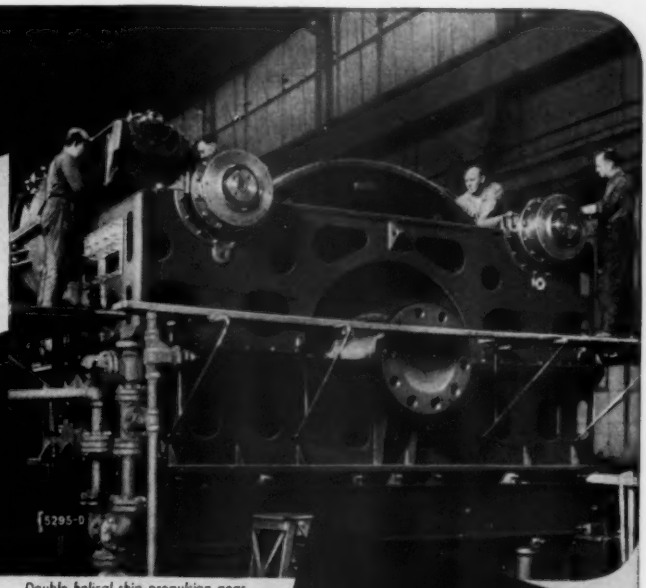
P. O. Box 683, Jacksonville, Fla.

PARTS ARE GAGED *before and after* THE TEST RUN



*Double helical ship propulsion gear on test floor at the De Laval Works*

In the De Laval Works each part of a machine is manufactured to limit gages on an interchangeable basis and then, after assembly, the complete pump, compressor, steam turbine or gear is tested under operating conditions to make sure that performance guarantees are met and that the unit is mechanically perfect.

Following the test, the machine is taken down and the parts carefully scrutinized and gaged again, in order to detect any deviation from normal. This practice and policy insures that the purchaser will in every instance receive a correctly built and perfectly operating machine.

M-30

De Laval STEAM TURBINE CO. TRENTON 2, N.J.

MANUFACTURERS OF TURBINES . . . STEAM, HYDRAULIC; PUMPS . . . CENTRIFUGAL, CLOGLESS, ROTARY DISPLACEMENT, MOTOR-MOUNTED, MIXED-FLOW, PROPELLER; PRIMING SYSTEMS; CENTRIFUGAL BLOWERS and COMPRESSORS; GEARS . . . WORM, HELICAL, and FLEXIBLE COUPLINGS

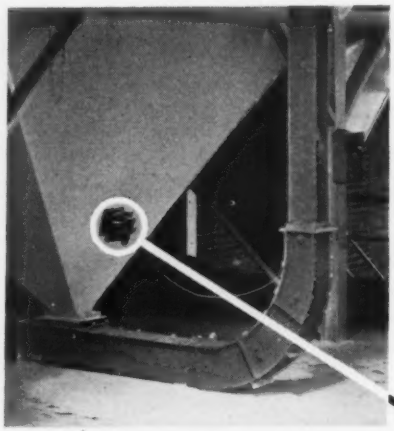
(*Continued from page 18*)

**Frank H. Stephenson,** who has been associated for the past 8 years with the Tennessee Valley Authority at Knoxville, Tenn., has retired from active work and will live in Worcester, Mass. He has been an A.W.W.A. member since 1920.

**J. R. Janssen** of Cheshire, Conn., has been appointed Connecticut Representative of the America Well Works of Aurora, Ill. Janssen is a graduate of Northeastern University and has had wide experience in engineering sales and service of centrifugal pumping units and other items of water and sewage works application.

**Fiber containers are now lined with lead foil** for carrying such liquid products as paint, the Lead Industries Assn. has announced. Spirally-wrapped fiberboard has cemented to it, with a bituminous adhesive, a thin sheet of lead foil. The fiberboard provides the strength to withstand normally rough handling. The ends are of enameled black plate crimped over the lead-lined fiber.

(*Continued on page 44*)

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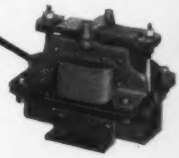
*"Pulsating Magnet"*

**ELECTRIC VIBRATORS**

*with rheostat control of power*

will prevent the arching-over and hanging-up of chemical storage bins and hoppers



ASSURE FREE-FLOWING CHEMICALS FOR CONTINUOUS OR INTERMITTENT TREATMENT.

Eight models, from a little 4 lb. size to a big 500 lb. size

**SYNTRON COMPANY**

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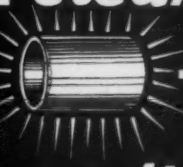
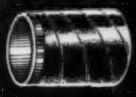
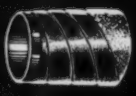
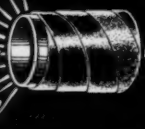
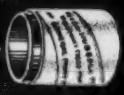
*Steel pipe* + HILL-HUBBELL *cleaning and priming*  + HILL-HUBBELL *multi coating*  + HILL-HUBBELL *asbestos felt wrapping*  + HILL-HUBBELL *multi coat lining*  + HILL-HUBBELL *imprinted* 80 LB KRAFT *paper*  =

**HILL-HUBBELL • • •**
***Steel pipe protection!***

**GENERAL PAINT CORPORATION**
HILL, HUBBELL & CO. • Division • Cleveland, Ohio
• EXPORT OFFICE: SAN FRANCISCO, CALIFORNIA, U. S. A. •

(*Continued from page 20*)

**The Water Works Short School,** conducted by the South Carolina Water Works Assn. and the South Carolina State Board of Health, was held at Clemson College, Clemson, S.C., on April 11 and 12. Lectures were given on "Fresh Water Organisms," by Prof. D. B. Rosenkrans, "Chemistry of Water Treatment," by Prof. J. H. Mitchell, and "Bacteriology," by Dr. W. B. Aull. Laboratory instruction was given, and Guy H. White, Supt. of the Columbia, S.C., Water Plant, displayed charts and drawings of various phases of water treatment.

The annual business meeting of the association voted to change the name of the organization to the South Carolina Water and Sewage Works Association, to enlarge the Board of Directors, and to revise the constitution and general program of the association to cover sewage works operators. It was also voted to make the Clemson Short School, with the annual business meeting held in conjunction with it, an annual affair.

**The employees of the Worthington-Gamon Meter Co.** received the Army-Navy "E" award on April 27 for their outstanding production of 75-mm. shell fuses. These fuses are "one of the most difficult army

(*Continued on page 46*)

DIFCO

## Direct Plate Counts of Coli

**Bacto-Brilliant Green Lactose Bile Agar**

is an excellent plating medium recommended for direct counts of coliform bacteria in water. This medium conforms to the formula of Noble and Tonney as described in "Standard Methods of Water Analysis" 1936. After incubation for 18 hours at 37°C. typical colonies of coliform types are deep red and are surrounded by a pink halo.

**Bacto-Violet Red Bile Agar**

is a recommended medium for direct plate counts of the coliform organisms in water. On plates of this medium the coliform types produce red colonies surrounded by a reddish zone of precipitated bile. Counts are made after incubation at 37°C. for 18 hours.

Specify "DIFCO"

DIFCO LABORATORIES
INCORPORATED
DETROIT 1, MICHIGAN, U. S. A.

# COMPLETE SELECTION in Socket Fittings!

Sleeve (Solid)
Fig. 521

Plug
Fig. 523

Flanged Socket
Fig. 528

Cap
Fig. 524

⅛ Bend
Fig. 507

¼ Bend
Fig. 501

Reducer
Fig. 526

Every type of socket fitting needed for water works construction and maintenance is included in Grinnell's line.

Special features of Grinnell Socket Fittings:

1. Improved design cuts size and weight and lessens friction losses.
2. All socket and spigot dimensions and wall thicknesses are the same as A.W.W.A. Standard Class "D" Pipe.
3. All fittings suitable for use with Super-deLavaud centrifugally cast Bell and Spigot Pipe.
4. Although listed for only 150 lbs. working pressure, suitable for 173 lbs. water pressure as specified for A.W.W.A. Class "D" Fittings.

*Write for Catalog 1,*

*"Water Works Specialties".*

GRINNELL COMPANY, INC.

Executive Offices: Providence 1, R. I.

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| Atlanta 2, Ga. | New York 17, N. Y. |
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| Houston 1, Tex. | St. Louis 10, Mo. |
| Los Angeles 13, Cal. | St. Paul 2, Minn. |
| Minneapolis 15, Minn. | San Francisco 7, Cal. |

Seattle 1, Wash.

Tee
Fig. 514

Cross
Fig. 516

Split Sleeve
Fig. 522

Tee
Fig. 511

Warren Coupling
Fig. 533

Long ¼ Bend
Fig. 505

# GRINNELL

WHENEVER **PIPING** IS INVOLVED

(*Continued from page 44*)

ordnance items to produce," according to Maj. George L. Cory, Chief, Ammunition Branch, N.Y. Ordnance District, who made the award. Worthington-Gamon's "E" is the fifteenth of the production honors accorded various units of the Worthington Pump & Machinery Corp., Harrison, N.J.

**For delivering 8,000,000 lb. of valves** for the Victory Fleet program in 1943, the employees of the Kennedy Valve Mfg. Co. have received the "M" pennant and the Victory Fleet flag from the U.S. Maritime Com. Charles E. Walsh Jr., Dir. of Procurement, U.S.M.C., cited the workers for having "many times gone beyond the required schedule to enable shipyard workers to deliver ships, ready to sail, in record time."

At presentation ceremonies, Walsh told that the Liberty Ship requires 1,400 iron, steel and bronze valves, totalling 15.3 tons, in addition to 29.5 tons of valve fittings. The new Victory Ship requires about the same number of valves and fittings as the Liberty Ship, but the refrigerator ship requires a total of 95.3 tons of valves and fittings. The average tanker requires 194.26 tons of valves and fittings.

(*Continued on page 48*)


# *Enough For Everybody!*

## HAYS WATER WORKS PRODUCTS

While the men and women of our armed forces are "rubbing shoulders" with many of Hays Standard Products as well as specialized items made for the Army, Navy and Air Corps on all fighting fronts, Hays is also producing a complete line of waterworks materials for the "home front" in sufficient quantities to fill all of your requirements. We have never relaxed our efforts to supply whatever is needed for your services in sufficient quantities, and on time.

Our representatives are again in the field to call upon you regularly. In the meantime check up on your waterworks requirements. Send in your orders. We'll do our best to make shipment promptly.

OUR SEVENTY FIFTH ANNIVERSARY

HAYS MANUFACTURING CO • ERIE • PA.

WATER WORKS PRODUCTS

HAYS

(SINCE 1869)

★ Invest in Bonds today to provide for extensions tomorrow ★ ★ ★

*Nature made Asbestos* – HERE IS HOW KEASBEY & MATTISON IS MAKING IT SERVE THE WATER WORKS FIELD

K&M "Century" Asbestos-Cement Pipe is immune to costly, troublesome tuberculation from *within* . . . no flow-hamper, no pressure cuts, no quick replacements needed. It also resists corrosive action from *without*... it is non-metallic and therefore unaffected by electrolysis. You can count on permanently smooth, free-flowing mains—without ordinary service interruptions—because you have a *healthy* line of pipe when you use K&M "Century" Asbestos-Cement Pipe.

"Century" is very moderate in price. The amount of labor required to install it is low, because "Century" is light and easy to handle. Then there's real saving in "Century's" long life without expensive upkeep. And "Century" insures constant satisfaction and good will in your community.

K&M "Century" Asbestos-Cement Pipe is available NOW. Inquire today.

Our Ambler plants proudly fly the Army-Navy "E" flag with its star—an honor awarded K & M employees "for continued outstanding production of war materials."

**KEASBEY & MATTISON**
**COMPANY • AMBLER • PENNSYLVANIA**

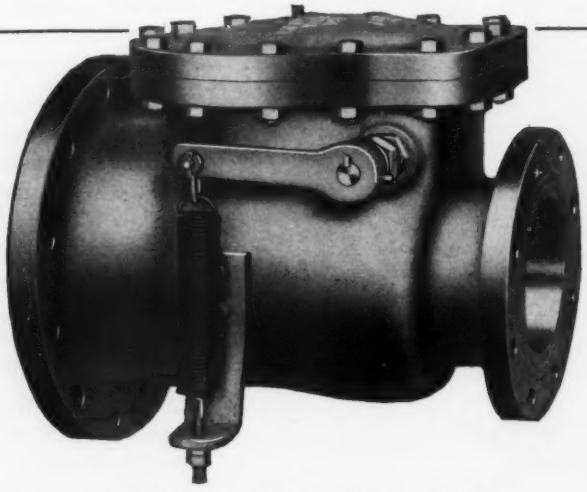
(*Continued from page 46*)

Although the Kennedy Valve Mfg. Co. has sent 150 young men into the Armed Forces and there have been no replacements, the company did a particularly outstanding production job and is one of 6 valve manufacturing companies in the nation to receive the "M" award.

**Speed-up motion pictures in color** for the study of very slow processes have been found highly satisfactory by the Combustion Engineering Co. of New York, according to their Director of Education, Otto de Lorenzi. He described "A Study of Stoker Fuel Beds" in a paper delivered at the spring meeting of the American Society of Mechanical Engineers, held in Birmingham, Ala.

"The general impression gained, when looking into a stoker-fired furnace," de Lorenzi said, "is that the fuel bed is motionless, incandescent and active. While the actual motion is very slow, nevertheless it is positive and regular. The slowness makes it difficult for the human eye to see, follow and remember successive steps during any given cycle. . . . Also, no two observers see the same sequence of occurrences unless there is ample repetition. As a result, there may be differences of opinion . . . conclusions or suggestions. . . .

(*Continued on page 50*)

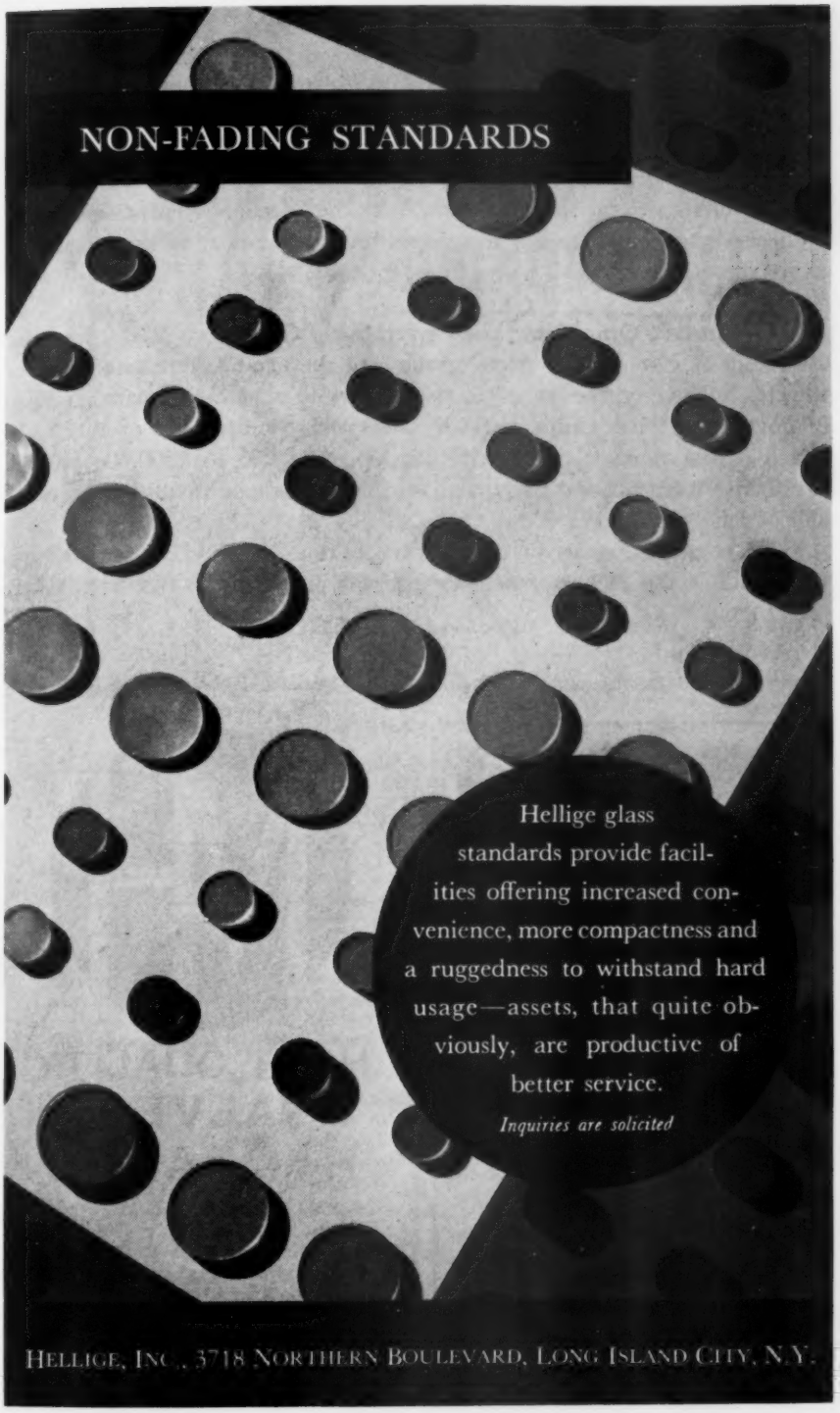


**RENSSELAER**

**LIST 340**

**Clearway Quiet-Closing Check Valves eliminate "SLAM." Made in straight-thru type, as well as expanding outlet type for bolting direct to pump discharge. Write for Bulletin V.**

**RENSSELAER VALVE CO. TROY, N. Y.**


NON-FADING STANDARDS
Hellige glass standards provide facilities offering increased convenience, more compactness and a ruggedness to withstand hard usage—assets, that quite obviously, are productive of better service.
Inquiries are solicited
HELLIGE, INC., 3718 NORTHERN BOULEVARD, LONG ISLAND CITY, N.Y.

(*Continued from page 48*)

"A valuable tool, in the form of 'speed-up' motion pictures, is available for analyses of this type. With its use the stoker may be operated normally. The exposure rate can be adjusted to secure any desired degree of speed-up. The resulting picture is then projected over and over again, reproducing every detail and sequence of operation. The accelerated action permits a careful study of changes as they occur. Repetition enables all observers to see the same thing and thus concur in their understanding as to causes and effects."

**Cincinnati, Ohio,** has raised itself from Class 3 to Class 2 in the Natl. Bd. of Fire Underwriters' grading of the fire-protection facilities of the city. The city, the largest in the country to have a city-manager form of government, has eliminated 407 "deficiency points" out of the 1,316 which it had when it was rated Class 3. $300,000 to $500,000 will be saved by Cincinnati and its citizenry in fire insurance premiums as a result of this "clean up."

There are no cities in the country in the N.B.F.U.'s Class 1, and Cincinnati is the 20th city of over 100,000 people to be put in Class 2.

(*Continued on page 52*)

**PIPE ACCORDING TO THE A. S. A. LAW OF DESIGN**

Mono-Cast Centrifugal Pipe can be manufactured in specific weights for specific laying conditions, and in accordance with the recently adopted A. S. A. Law of Design. You get the *exact* pipe your conditions call for.

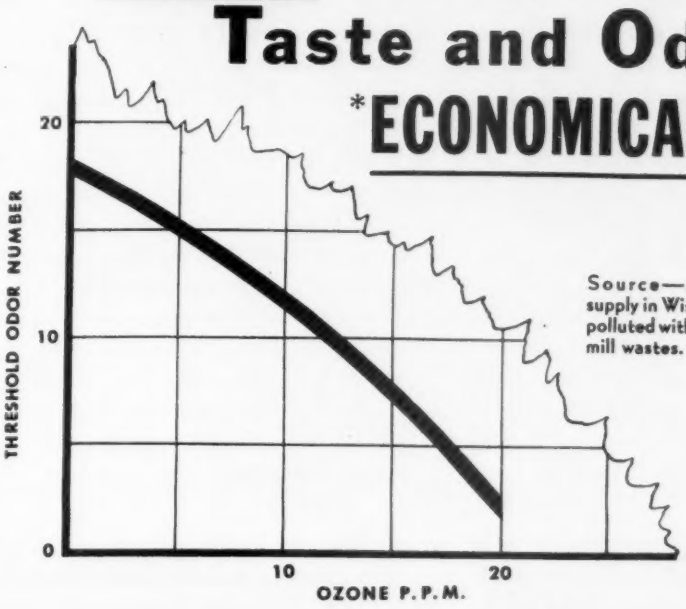
**PROMPT DELIVERIES with suitable priorities**

**AMERICAN CAST IRON PIPE CO.**
**BIRMINGHAM 2, ALABAMA**
*Sales Offices in Principal Cities*

**HIGH QUALITY VALVES HYDRANTS**

**M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.**

# Ozone Removes Taste and Odor *ECONOMICALLY




Source—A river supply in Wisconsin polluted with paper mill wastes.

| OZONE | | ODOR | TASTE |
|---|---|---|---|
| APPLIED P. P. M. | RESIDUAL P. P. M. | NUMBER | |
| 0.0 | 0.0 | 18 | FISHY |
| 1.0 | 0.0 | 12 | AGREEABLE |
| 1.6 | 0.0 | 6 | AGREEABLE |
| 2.0 | TRACE | 2 | NONE |

*Contingent on local climatic conditions, it takes only 10-12 kw.-hr. to generate and apply one pound of ozone.

Ozone is a powerful oxidant—some chemists call it activated oxygen. Its principal value in water treatment, especially for the removal of taste and odor, lies in its remarkable ability to "burn-up" (oxidize) taste and odor producing impurities, with the unique advantage of leaving no residue or new chemical in the water.

*Post War Planning*—a large capacity ozonator, developed from wartime research, eclipsing any previous ozone equipment in efficiency, dependability, and practicability. Designed especially for simple operation and easy maintenance.

E WELSBACH M

## OZONE PROCESSES

*INCORPORATED*

1500 WALNUT ST., PHILADELPHIA 2

A wholly owned subsidiary of Welsbach Engineering and Management Corporation

(*Continued from page 50*)

There are 8 cities of 25,000 to 100,000 in this class, but none under 25,000 are included. One-third of the municipalities with over 25,000 population are in Class 4.

**To protect the National Forest** located on the Shenandoah River below its Front Royal, Va., plant, the American Viscose Corp. has recently created a Sanitary Division in its Engineering Department. This division has concentrated on a stream pollution abatement program.

A disposal plant has been built to prevent the discharge of wastes into the river. The sewage disposal unit is composed of a bar screen, Imhoff tanks, dosing tanks, trickling filters and sludge drying beds. Since there is no final settling tank for the filter effluent, the effluent is mixed with other treated wastes, which travel to large settling basins.

The outflow from the disposal plant and from the sulfide and acid treatment units is mixed with the balance of the wastes from the main plant and discharged into 3 settling and retention basins where all material in suspension is settled. The discharge from this basin into the river is clear.

The job done by the Viscose Corp.'s Sanitary Division has been praised by the Virginia Commission of Game & Inland Fisheries.

(*Continued on page 54*)

RUSTOP
YOUR STEEL TANKS AND STANDPIPES

Corrosion . . . the worst "enemy" of your steel tanks and standpipes can now be licked completely and permanently . . . with RUSTOP.

RUSTOP is a cathodic method that removes old rust on submerged surfaces and keeps new rust from forming. It is a *permanent protection* . . . installed without interruption to service . . . at small cost . . . operates for only a few cents per month . . . eliminates necessity of sandblasting, scraping or painting. Is Guaranteed. Safeguard your tank. Cut down on tank repairs and maintenance. Investigate RUSTOP today.

No Paint, No Chemicals

RUSTOP
Dayton 10, Ohio. U.S.A.
ELECTRO RUST-PROOFING CORPORATION

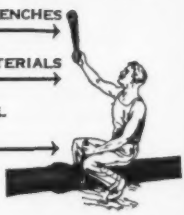
3 *Money, Time and Labor Saving Features of*

UNIVERSAL
CAST IRON PIPE

LAID WITH ONLY WRENCHES

NO CAULKING MATERIALS

NO GASKETS. NO BELL HOLES TO DIG.



For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.

*Dept. C*
THE CENTRAL FOUNDRY COMPANY
386 FOURTH AVENUE, NEW YORK 16, N. Y.

Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.

NAME _____

STREET _____

CITY _____

# CONCENTRATED SANITATION!

## 70% AVAILABLE CHLORINE IN THIS MOBILE CHLORINE CARRIER

READY for any emergency, Mathieson Sanitation HTH swiftly destroys bacteria, objectionable odors and other contamination. Dry and free-flowing, HTH is easy and economical to use. It provides the chlorine needed to safeguard health and prevent the menace of waterborne disease.

Always keep Sanitation HTH on hand. It's proven ideal not only for emergencies, but for regular treatment of water supplies and sewage effluents, and for sterilizing new watermains. HTH is very useful and effective in swimming pool sanitation, as well.

A valuable 80-page handbook "Hypo-Chlorination of Water" has been prepared especially to help you. Write for a copy now. It's yours for the asking.

**Mathieson**
CHEMICALS

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42nd ST., NEW YORK 17, N. Y.

Sanitation H T H . . . Liquid Chlorine . . . PH-Plus . . . Fused Alkali . . . Caustic Soda . . . Soda Ash
Bicarbonate of Soda . . . . Bleaching Powder . . . . Ammonia, Anhydrous & Aqua . . . . Dry Ice
Carbonic Gas . . . . Synthetic Salt Cake . . . . Sodium Chlorite Products . . . . Sodium Methylate

(*Continued from page 52*)

## MONTANA SECTION MEETING

The 19th Annual Meeting of the Montana Section was held May 5–6 at the Hotel Baxter, Bozeman. Eighty-three persons enrolled, breaking previous registration records, and 115 attended the final dinner.

F. F. Palmer reviewed briefly the efforts and failures of the Section to make licensing of water works operators a legal procedure in Montana, and proposed, on the part of the Licensing Committee, a system of voluntary licensing similar to that already in operation in some other states. The problem child was tossed into the lap of a new committee, of which Dean W. M. Cobliegh, Montana A. & M. College, is Chairman, with an injunction to the committee to put such a system into operation.

Dr. Cobliegh, in a lecture on stream pollution, pointed out that the 2 principal drainage areas in Montana are the Mississippi-Missouri (85.0%) and the Columbia (14.9%), but in the 124,368 sq.mi. of the Mississippi-Missouri basin there are 69 separate sewage systems serving approximately 130,000 people, while in the 21,801 sq.mi. of the Columbia there are 100,000 people served. There are no other bases, however, Dr. Cobliegh believes, for evaluating the problems in any individual situation

(*Continued on page 56*)

*The name that speaks Volumes on the Water-front*

**PEERLESS PUMP DIVISION, Food Machinery Corp.**
**301 W. Ave. 26, Los Angeles 31, Calif.**
**1250 W. Camden Ave., S. W., Canton 6, Ohio**
**Other Factories: San Jose 5, and Fresno 16, Calif.**

**WATER REFINING EQUIPMENT HEADQUARTERS**
INDUSTRIAL—PROCESS
RAILROAD—MUNICIPAL—HOUSEHOLD

**FILTERS** Of All Types *and* Capacities . . . Gravity . . . Pressure

**SOFTENING SYSTEMS**
All Types *and* Capacities—Zeolites (*synthetic and natural*) and Lime and Soda

**CHEMICAL FEEDERS** (wet or dry)
Acids . . . Hypochlorites . . . Alkalies

**EQUIPMENT FOR REMOVAL**
Of Iron . . . Taste . . . Odors . . . Colors . . . Suspended Matter

**SWIMMING POOL EQUIPMENT**
**AERATORS · DE-GASIFIERS**
**WATER TEST SETS**
**RE-CARBONATORS**

*The* **AMERICAN WATER SOFTENER COMPANY**
WATER REFINING EQUIPMENT HEADQUARTERS
INDUSTRIAL · PROCESS · RAILROAD · MUNICIPAL
HOUSEHOLD, ETC.
322 LEHIGH AVE., PHILA., PA.

# 1879—ROSS—1879

## AUTOMATIC VALVES

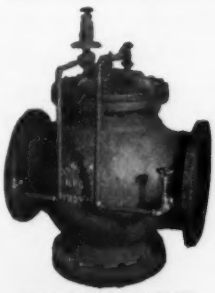
ALTITUDE VALVE

Controls elevation of water in tanks, basins and reservoirs

1. Single Acting
2. Double Acting

Maintains safe operating pressures for conduits, distribution and pump discharge

SURGE-RELIEF VALVE



REDUCING VALVE

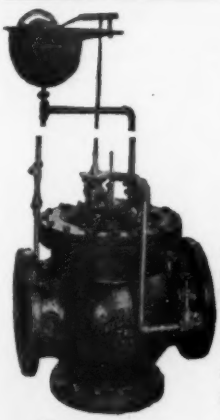
Maintains desired discharge pressure regardless of change in rate of flow

Regulates pressure in gravity and pump systems; between reservoirs and zones of different pressures, etc.

A self contained unit with three or more automatic controls

COMBINATION VALVE

Combination automatic control both directions through the valve.

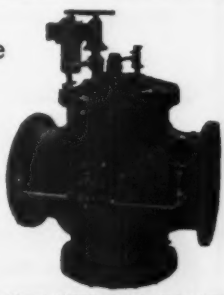


FLOAT VALVE

Maintains levels in tank, reservoir or basin

1. As direct acting
2. Pilot operated and with float traveling between two stops, for upper and lower limit of water elevation.

Electric remote control—solenoid or motor can be furnished



REMOTE CONTROL VALVE

Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

*Packing Replacements for all Ross Valves Through Top of Valve*

**ROSS VALVE MFG. CO., INC., P. O. BOX 593, TROY, N. Y.**

(*Continued from page 54*)

than those of possible overburden of streams, reasonable stream cleanliness and the economics applicable to each case.

A panel discussion of Treasury Dept. Standards revealed some primary difficulties:

The water supply purveyor has no legal responsibility or authority on private premises, hence he cannot effect sanitary defects in plumbing there. He has no machinery to force eradication of such defects or to prevent their reinstallation once they are corrected.

While the chemical and physical quality standards may be less difficult, the frequency of analyses required is somewhat obscure and in some cases the standards seem quite restrictive.

The bacteriological standards require more than the usual testing on the part of laboratories but apparently are being met where strictly applied. No widespread effort is made to use the 5–100-ml. portions specified in the Standards.

Maj. G. E. Arnold of the War Production Board detailed the present situation, in which the WPB has eased up on cast-iron pipe, on copper tubing in stock and on reinforcing steel. Wood, he said, is "tight" and

(*Continued on page 58*)

**Vogt Fire Hydrants**

Standard—
"Traffic Model"—
Flush Type—
Water Crane—
Type

**Vogt Gate Valves**

Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit any Type Pipe.

Also—Floor Stands, Shear Gates—Tapping Sleeves and Valves, Flap Valves and Mud Valves.

**Vogt Brothers Mfg. Co.**
INCORPORATED
MAIN AT 14th ST.
LOUISVILLE KENTUCKY

**WATER PURIFICATION MORE ACCURATE SAFER — EASIER**

Ster-Elators by Everson

Single valve control makes operation easier, permits quick and exact adjustments to meet changing conditions.

Because Everson Ster-ElatorS operate under a high vacuum (equivalent to 2" of mercury), any accidental break or failure admits air which actuates automatic shut-off. This also increases operational efficiency in feeding chlorine.

Rota-Meter Visible Gas Feed Indicator—99½% accurate in measuring gas flow.

Sizes to meet any capacity range requirement. Automatic, semi-automatic, or manual control of gas feed.

*Write for Bulletin*

**EVERSON MFG. CO.**
221 W. HURON ST. CHICAGO 10, ILL.

# THESE METER FEATURES WON THE BIGGEST CONTRACTS!

## . 3 Reasons Why WORTHINGTON-GAMON Meters Were Specified

The largest water meter contracts awarded in the United States named "Watch Dog" meters.

This choice is due to these facts:

1. Worthington-Gamon has the longest experience of any water meter manufacturer—a fact which suggests superior performance over the longest life.
2. Manufacturing controls established not just for meters, but for a broad line of Worthington equipment used by municipalities, provide greater assurance of low-cost maintenance.
3. Constantly-improved Worthington-Gamon meter designs have developed an unusual ability to measure accurately even the smallest quantities of water.

No other water meter manufacturer maintains as extensive service facilities as Worthington-Gamon—24 district offices are located in 24 leading cities.

Worthington water meter technicians and Worthington Research Laboratories will help you work out a plan for better, lower-cost metering.

The Meter Specified in the Largest Contracts Ever Awarded in the U. S.

WG 4-5

*Subsidiary of*

**WORTHINGTON PUMP AND MACHINERY CORPORATION**

Power Plant Equipment • Turbines & Turbo-Generator Sets • Condensers, Heaters, Ejectors • Water Purification Equipment • Pumps, Stationary and Portable Compressors • Air Conditioning & Refrigerating Equipment • Power Transmission Equipment • Construction Machinery, Equipment for Mines • Locomotive Feedwater Heaters • Welding Positioning Equipment • Liquid Meters

## WORTHINGTON-GAMON METER COMPANY

**282-296 South Street, Newark, New Jersey**

"Watchdog" models . . . made in standard capacities from 20 GPM up; frostproof or split case in household sizes. All parts interchangeable with your present meters of our manufacture. Write for Bulletin.

PALMER Filter Bed AGITATORS

Prevent Sand Beds From Cracking
Eliminate Mud Balls
Save Wash Water
Lengthen Filter Runs
Higher Rates of Filtration

ACTIVATED ALUM • BLACKALUM • PALMER FILTER BED AGITATORS
STUART-BRUMLEY CORP., 516 N. Charles Street, Baltimore - 1, Md.

(*Continued from page 56*)

results, for example, in limited use of concrete as a consequence of the limitations on lumber for concrete forms.

David S. Thomas was nominated for the Fuller Award. He has been a member of the A.W.W.A. since 1927, was Chairman of the Montana Section in 1934–35, and has been Editor of the Section Proceedings since 1938.

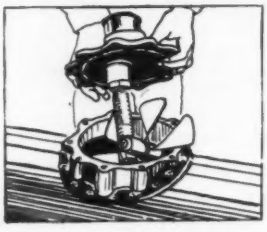
H. B. Foote
*Secretary-Treasurer*

**"Telling Employees About Their Company"** is a new pamphlet useful as a guide in employee-employer relationships which may be obtained by executives who write on their business stationary to the Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10, N.Y.

**The annual meeting of the South Dakota** Water and Sewage Works Conference will be held at the Lincoln Hotel, Watertown, S.D., on September 19 and 20.

(*Continued on page 60*)

SPARLING MAIN-LINE METERS



Easy to Install *for*
Consistent Accuracy and
Long Service

SPARLING

*Manufacturer of Water Measuring Equipment*

LOS ANGELES 54, Box 3277, Terminal Annex 622 Broadway ..... CINCINNATI 2
CHICAGO 16.....3104 South Michigan Ave. 101 Park Avenue.....NEW YORK 17
BOSTON 8.....6 Beacon Street

# LANDMARKS

The old
and the new
share something
decidedly worth-while.

The massive skyscraper,
*built to last . . .*
The Ludlow Hydrant,
old in service
but dependable as ever
a symbol
of lasting security . . .
true Landmark
of the American Scene.

*You're interested . . .* in quick water; proper shut-off without water hammer; correct drainage; easy inspection and servicing. Let us send you full information.

*The* LUDLOW VALVE MFG. CO., INC.
TROY, NEW YORK

H-1

**LUDLOW**
**HYDRANTS**
**& VALVES**
SINCE 1866

COOK Well Strainers

A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.
Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 58*)

**The contributions of professional societies** to the advancement of the war were cited in the June issue of *The U.S. Piper,* house organ of the U.S. Pipe & Fdry. Co. Says *The Piper:*

At the outset of the war various industrial associations were called upon by one or more government agencies to furnish data about the capacity to produce their standard products and their ability to expand or convert their facilities to manufacture war material. The existence of such organizations expedites the procurement of potential production data and furnishes a mouthpiece for . . . industry in discussions with, and establishment of policies by, government agencies as to how it can most effectively contribute to the war effort.

The American Standards Association, typical of many similar bodies, has done an excellent job in speeding up the completion of many specifications in the interests of standardization. It has also issued many emergency standards for substitute products that could be made with less, or without any, materials that are critically short. Issuance of the National Emergency Steel Specifications is . . . a good example of how new standards . . . are quickly drawn up and adopted to save many tons of critically-short alloys.

Associations representing public utility services such as the American Water Works Association, American Gas Association and Federation of Sewage Works Associations have furnished data, advice and technically trained personnel to various governmental agencies. Through their meetings and publications they have kept their members advised of the latest governmental regulations, and of how to conserve critical materials and at the same time maintain or expand their services to meet the wartime demand. They have also been very active in various phases of postwar planning.

What these associations and societies have accomplished over the years and particularly during more than two years of this terrific conflict should entitle them to some such slogan as—Valuable in peacetime; indispensable in time of war.

*Judged the Most Popular*

ACTIVATED ALUM

BLACKALUM

PALMER SURFACE WASH SYSTEMS

STUART-BRUMLEY CORP.,
516 N. Charles Street, Baltimore - 1, Md.

# NEWS OF THE FIELD

**Postwar planning is in the doldrums.** There are many factors responsible. When the various groups and committees went to work from a year to two years ago, they had an objective which was good then and still is good. This country never had a more history-making problem to face than the reconversion from war to peacetime pursuits and the maintenance of employment for all who should be at work in peacetime. How we meet this problem will set the way of living for all the years ahead for everyone now alive.

But the promotion got ahead of actualities. Most serious has been the stagnation of policy and planning at the federal administrative level. The Baruch report is still a report and very little of it has become national practice. The military leaders disagree with the War Production Board on the primary steps toward reconversion. The ghost, or shall we say the spirit, of possible Federal aid stymies clear thinking at the state and local level.

Water and sewage works are actually being bluprinted now at almost double their proportionate rate in the public works construction field, but water works and sewage works men are being criticized for delay and dreaming and wishful thinking. Many people forget that water works men are human beings working in the public field and that this year 1944 is a political year.

Certainly—ideally and intellectually we all should be planning our postwar work and jobs. We know that as a matter of common sense. But this year's actions at national, state, or local levels on internal problems are not seen to be clearly founded on common sense. We thank God for our military organization and our industrial support of the military forces and wonder why we can't show half as much ability in planning for the peace—even though we know that both jobs must be done at the same time.

It is the feeling that the job for blueprinting for the postwar period must go on that has led the Committee on Water and Sewage Works Development to decide to carry on its promotional work beyond the time limit originally set. When the work was started, it was scheduled to close July 1. But planning is in the doldrums now, so the Committee feels that it must stay by the ship until the trade winds pick up again and we can move forward with the rest of the planners—to the blueprinting of work to be done when the war is done.

(*Continued on page 2*)

(*Continued from page 1*)

**E. L. Filby** returned on July 1 to his regular activities as Principal Asst. Engr. with Black & Veatch, Cons. Engrs., Kansas City, Mo. Filby was Field Director of the Committee on Water and Sewage Works Development from Sept. 1, 1943, until the end of June, in which capacity he travelled about 50,000 mi., gave 62 talks and held 94 conferences. Although the field promotion work carried on by Filby is now terminated, the committee will continue to function in an advisory manner in connection with "Blueprint Now" postwar plans of water and sewage work.

**Capt. Raymond E. Piner,** former Chemist, Springfield, Mo., City Water Co., is "somewhere in the New Hebrides," where he is attached to a station hospital doing general sanitation work, involving both laboratory and field duties. Capt. Piner, who was recently promoted to that rank, has been on active duty since June 1941.

Capt. Piner, in a V-Mail message to the Association, says, "I haven't seen anything that I would trade Missouri for. . . . I am depending upon the JOURNAL to keep me informed on new developments and practices in the water works field so that I won't be too 'old fashioned' when I return."

**Harry F. Irwin,** former Asst. Supt., Water Works & Parks, Ogden, Utah, is now serving as a Civilian Engr. in the Pacific Div., U.S. Army Engineers, at San Francisco. Irwin was in the water department at Ogden for 27 years.

**Lt. Robert S. Phillips,** who went to Lawson General Hospital, Atlanta, Ga., from his indoctrination course at Carlisle Barracks, Pa., has been made Medical Inspector at Ream General Hospital, Palm Beach, Fla. Lieutenant Phillips is former Chief Chemist of the Durham, N.C., Water Dept., and Secretary-Treasurer of the North Carolina Section, A.W.W.A. He entered the Service in January.

(*Continued on page 4*)

**NIAGARA IRON CASE WATER METERS**

provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

**WRITE FOR CATALOG.**

**BUFFALO METER COMPANY**
Established 1892 2914 Main St., Buffalo, N. Y.

CITY post-war planners with any eye to the comfort and happiness of their citizens, are investigating water softening equipment now. Performance records of Refinite installations in many municipalities throughout the country have proved the efficiency and economy of Refinite equipment. When Refinite is recommended and approved for your city, your citizens are assured of luxurious, soft, iron-free water and the accompanying comforts and savings. Discuss your water problems with Refinite now. Quotations and recommendations furnished without obligation.

**The Refinite Corporation**

Write for Free Catalog—108 Refinite Bldg., Omaha 8, Nebr.

*PREVENT WEAR AND CUTTING of rods, plungers and shafts by using*

MABBS RAWHIDE PACKING

**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**

(*Continued from page 2*)

**Edward E. Wall,** 83, former Director of Public Utilities, St. Louis, died there on June 26. He was identified with St. Louis's progress in water supply for over 30 years.

After receiving his degree in Civil Engineering from the University of Missouri in 1884, and before commencing his career in the St. Louis Water Dept. in 1892, Mr. Wall was engaged in general engineering work. In 1906 he became Assistant Water Commissioner, and five years later was made Water Commissioner. In 1925 he became Director of Public Utilities and served one year, then opened an office for private practice, though he returned to his Public Utilities post in 1933 for another eight years.

While Water Commissioner, he built the "Chain-of-Rocks" filters, then the largest rapid filters in the world. A year later, he located the Missouri River water works for St. Louis, a 200-mgd., $25,000,000 plant, and then supervised its design and construction.

In his post with the Public Utilities, he completed the design for an $8,000,000 lighting system for St. Louis.

Mr. Wall, who joined the A.W.W.A. in 1904, served as a Trustee in 1924–26, and was elected to Honorary Membership in 1936.

(*Continued on page 6*)

**25 YEARS' EXPERIENCE**

**Assure Satisfaction With**

**SPARLING MAIN-LINE METERS**

Easy to Install *for*
Consistent Accuracy and
Long Service

SPARLING

***Manufacturer of Water Measuring Equipment***

LOS ANGELES 54, Box 3277, Terminal Annex — 622 Broadway ..... CINCINNATI 2
CHICAGO 16 ..... 3104 South Michigan Ave. — 101 Park Avenue ..... NEW YORK 17
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# Avoid the Postwar Scramble!

● Everything points to an unprecedented demand for water conditioning equipment of all types as soon as priorities are lifted. And it's only to be expected. Normal growth plus population shifts have made much equipment inadequate. Additional capacity is needed in thousands of communities . . . no doubt in yours.

But . . . much of the delay in this postwar scramble can be avoided. Study and analysis of your problem—engineering and designing of your equipment—preparation of blueprints and cost estimates—all can and should be done now. Then, when priorities are lifted, and while others are waiting in line, actual manufacture of your equipment can be started without delay.

In order to help you get this work done . . . now . . . we will send a Graver engineer . . . a specialist in water conditioning . . . to work with you and your consulting engineer. His broad experience in solving water conditioning problems of all types qualifies him to make unbiased recommendations and provide complete designs and cost estimates. And, his services are available without cost or obligation.

Let's get together . . . get your postwar plans on paper . . . your costs figured . . . and be ready for V-day.

*Process Equipment Division of*

GRAVER TANK & MFG. CO., INC.

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NEW YORK CATASAUQUA, PA. CHICAGO TULSA

GRAVER

WATER CONDITIONING EQUIPMENT

*Graver designs, builds, and installs water conditioning equipment of all types.*

**Hot Process Water Softeners • Zeolite Water Softeners • Water Filters • Iron Removal Filters • Taste and Odor Removal Filters • Reactivators • Swimming Pool Equipment.**

43-49W

(*Continued from page 4*)

**Robert Hall Craig,** 52, Consulting Engineer of Harrisburg, Pa., died on June 18 in a Philadelphia hospital after a six-week's illness.

Mr. Craig, who began his professional life as a member of the Chicago Cubs, was born in Middletown, Pa., and was educated at Girard College, Philadelphia. He received a Bachelor of Science degree in Sanitary Engineering at Pennsylvania State College in 1914, and a degree in Civil Engineering in 1920. Throughout his school years and early manhood he was an outstanding athlete. After his taste of major league baseball, he accepted a post as a sanitary engineer with a water company in Beaver Falls, Pa., and in a few years opened his own offices in Harrisburg.

Mr. Craig served on numerous commissions and committees, his foremost activity of this type being as Vice-President of the Susquehanna Drainage Area Flood Control Council. He belonged to numerous professional societies in addition to the A.W.W.A. and was owner and part-owner of several Pennsylvania water companies.

**Capt. A. J. Krell,** Sn.C., is "somewhere on the West Coast" in charge of a malaria control unit. Capt. Krell, who was a reserve officer in the Sanitary Corps, entered active service in March 1941, and was for two years Post Medical Inspector at Pine Camp, N.Y. He was in charge of water supply, sanitation, sewage treatment, garbage disposal and industrial hygiene in the post ordnance shops.

Capt. Krell was a sanitary engineer with William Raisch and Associates, New York, for two years, and before that was with the Bureau of Water Supply of New York, at the Ashokan Watershed.

(*Continued on page 8*)

ZECO GREENSAND ZEOLITE

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

**ZEOLITE CHEMICAL CO.**

**90 WEST STREET** **NEW YORK 62, N. Y.**

YOUR WATER PIPE PROJECTS ARE CRYING FOR ACTION!
Plan Now to Install
ALCO ELECTRIC WELDED STEEL PIPE
You'll want ALCO Electric Welded Steel Pipe because it's strong
—Because it is smooth—assures maximum capacity
—Because its long lengths assure minimum joints, rapid installation
—Because its light weight, too, makes for easier, faster handling
—And because it is widely known, widely used, is thoroughly dependable for vitally important water, gas, oil and sewer lines.
Make your plans now to get the ALCO Electric Welded Steel Pipe you will want. Line up your requirements—and tell us, so that your project will get precedence just as soon as restrictions are lifted.
American Locomotive
ALCO PRODUCTS DIVISION
30 Church Street, New York 8, N. Y.
Dunkirk, N. Y.
Buy War Bonds 5th War Loan

(*Continued from page 6*)

**Virgil R. Fleming,** 64, Assistant Professor of Theoretical and Applied Mechanics at the University of Illinois, died in Urbana, Ill., this spring after long being ill with a heart ailment.

Professor Fleming, who received a Bachelor of Science degree in Civil Engineering from the University in 1905, filled varying engineering assignments for two years and then became permanently associated with the University's College of Engineering. He had a wide consulting practice in hydraulic engineering in addition to his teaching duties.

Professor Fleming joined the A.W.W.A. in 1915.

**Major Frank Woodbury Jones** has completed his assignment as a reserve officer with the U.S. Public Health Service and has returned to his desk as partner in the firm of Havens and Emerson, Cons. Engrs., Cleveland. He served for 15 months as San. Engr. of the Fifth Civilian Defense Region.

(*Continued on page 10*)

THERE'S A HEAP LESS TROUBLE

IN LAYING BELL & SPIGOT MAIN with a Jointing Compound that

- Can't change its correct chemical composition
- Isn't subject to damage by rain or flood
- Melts quickly and handles easily
- Needs no skilled labor
- Weighs only 1/5th as much as lead and goes three times as far
- Delivers lastingly tight joints with far above the usual resistance to thermal and mechanical shock

WHICH ONE? You *guessed* it!

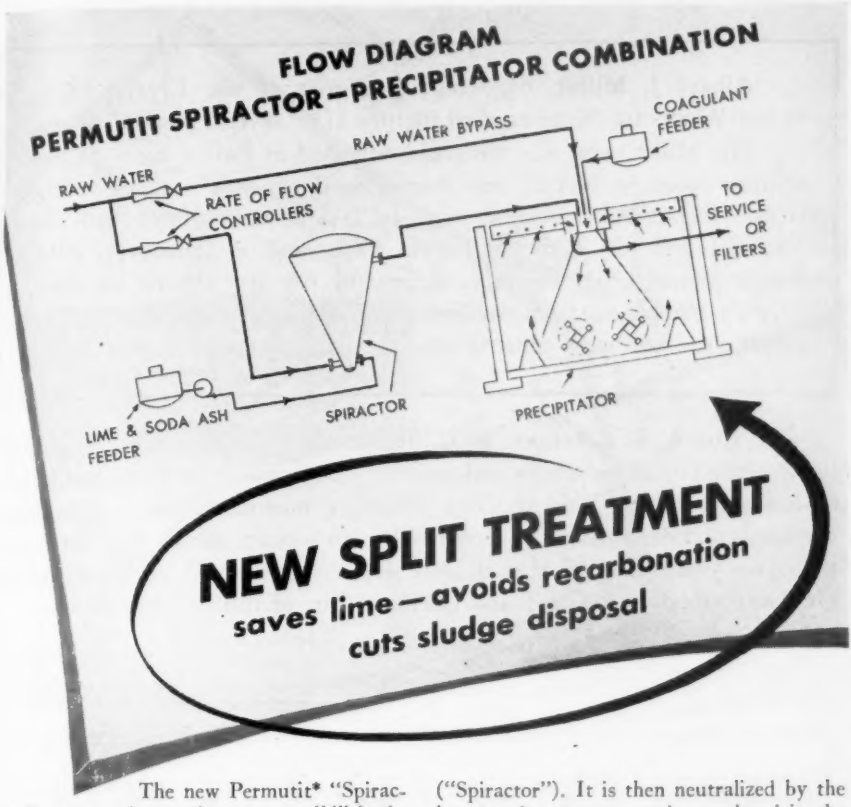
Tegul- MINERALEAD

The INGOT FORM Compound *for* Jointing Bell & Spigot Water Main

For complete information, write

*The* ATLAS MINERAL PRODUCTS CO. *of Pa.*

Mertztown • Pennsylvania




The new Permutit* "Spiractor" opens up interesting new possibilities in the treatment of municipal water supplies. The "Spiractor" is ideal for removal of calcium because it requires small space and low investment and because it minimizes the need for sludge disposal. Precipitates are removed by plating out on the catalyst granules, rather than as a dilute sludge.

For magnesium removal, the "Spiractor"–Precipitator combination is indicated. Utilizing the best features of both types of equipment, the calcium is removed in the "Spiractor" and the magnesium in the Precipitator. Where magnesium hardness must be reduced below 5 grains per gallon, split treatment as shown in the diagram is advisable. The major portion of the hard water is treated with all the lime and soda ash in the first stage ("Spiractor"). It is then neutralized by the by-passed raw water and coagulated in the second stage (Precipitator). This means a saving in lime and soda ash equivalent to the causticity (hydroxide alkalinity) which would normally be needed in one-stage treatment to obtain the same magnesium in the effluent.

Split treatment also eliminates recarbonation. Effluent of the second stage is stable and contains no causticity, so that water is of low enough pH value to go directly to the distribution system.

Existing lime soda plants can often be modernized advantageously by adding the "Spiractor" as a first stage. Write for full details to The Permutit Company, Dept. G2, 330 W. 42nd St., New York 18, N. Y. In Canada: Permutit Company of Canada, Ltd., Montreal.

*Trademark Reg. U.S. Pat. Off.

PERMUTIT
BETTER WATER MEANS HAPPIER CITIES ...Plan it NOW!
WATER CONDITIONING HEADQUARTERS

(*Continued from page 8*)

**Albert J. Miller,** 61, Chief Engineer of the Elyria, Ohio, Water Works for 30 years, died in June after several months' illness.

Mr. Miller, who was born and educated in Berlin, came to this country when he was 21 and started working as a fireman on the Great Lakes. After several years he became an engineer with the National Tube Co. works at Lorain, Ohio, and on January 1, 1914, was appointed Chief Engineer at near-by Elyria. During his time, Elyria's pumping station, million-gallon elevated tank, and million-gallon clear well were constructed.

**Lt. Col. A. S. Behrman, Sn.C.,** has completed the duties for which he was called to active service and retired. He is now Vice-Pres. in Charge of Research for the Velsicol Corp., Chicago, manufacturers of petroleum chemicals and derivatives. Colonel Behrman was on special duty for more than two years, first in Hawaii and since August 1943 in Washington. He was formerly Vice-Pres. and Chemical Dir. of Infilco, Inc., Chicago.

(*Continued on page 12*)


# *Enough For Everybody!*

## HAYS WATER WORKS PRODUCTS

**While the men and women of our armed forces are "rubbing shoulders" with many of Hays Standard Products as well as specialized items made for the Army, Navy and Air Corps on all fighting fronts, Hays is also producing a complete line of waterworks materials for the "home front" in sufficient quantities to fill all of your requirements. We have never relaxed our efforts to supply whatever is needed for your services in sufficient quantities, and on time.**

**Our representatives are again in the field to call upon you regularly. In the meantime check up on your waterworks requirements. Send in your orders. We'll do our best to make shipment promptly.**

OUR SEVENTY FIFTH ANNIVERSARY

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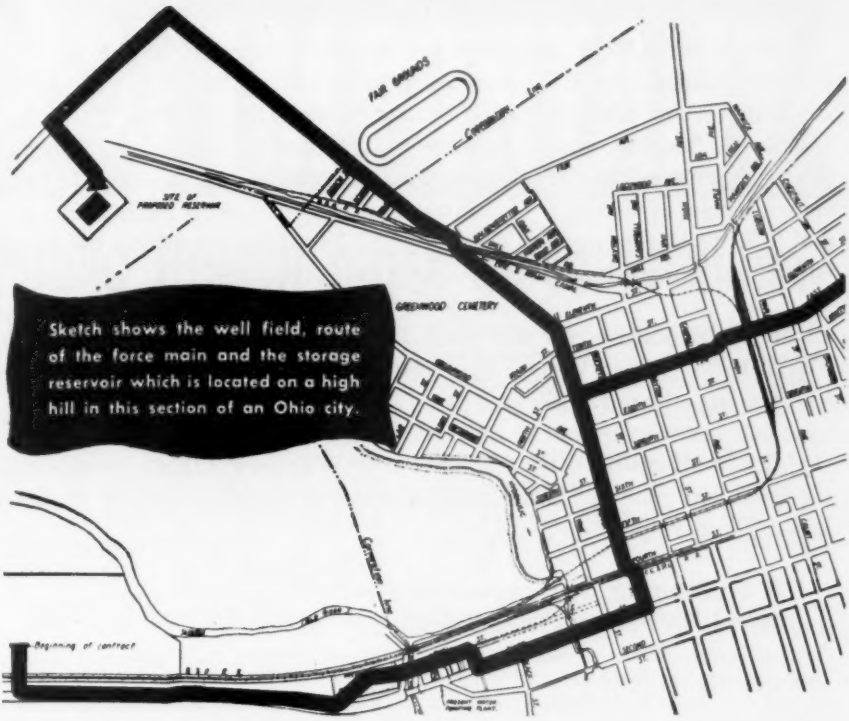
WATER WORKS PRODUCTS

HAYS

(SINCE 1869.)

★ Invest in Bonds today to provide for extensions tomorrow ★ ★ ★




Sketch shows the well field, route of the force main and the storage reservoir which is located on a high hill in this section of an Ohio city.

# HOW THIS CITY SAVED MONEY on a NEW FORCE MAIN

When plans were drawn for a new 24-inch water force main in a growing section of an Ohio city, engineers specified ARMCO Spiral Welded Steel Pipe. All the money-saving advantages of ARMCO Pipe were utilized in the design of the main.

Requirements for diameter and wall thickness of the pipe were accurately determined. No allowance for tuberculation was necessary because the smooth spun enamel lining provides continuing high flow capacity.

ARMCO Spiral Welded combines low installation costs with long service life. Savings start with hauling and handling. During installation, long 50-foot sections mean fewer connections, less assembly work. Strong tight joints are assured with any type coupling or by field welding.

When you plan your next force main see for yourself how you can save time and money by making use of the advantages of ARMCO Pipe in designing your water transportation system. The American Rolling Mill Co., 1131 Curtis St., Middletown, O.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

**ARMCO**

**SPIRAL WELDED PIPE**

**MEETS A.W.W.A. STANDARD SPECIFICATIONS**

(*Continued from page 10*)

**Three A.W.W.A. members** are working together in the Medical Research Laboratory at Edgewood Arsenal, Md. They are Maj. A. M. Buswell, former Chief of State Water Survey Div., Urbana, Ill.; Capt. Joseph M. Sanchis, former member of the Div. of San. Eng., Dept. of Water & Power, Los Angeles; and 1st Lt. Herbert E. Hudson Jr., Designing Engr. of Chicago. Lt. Hudson writes to A.W.W.A. headquarters that "there's lots of work to do, and you'll be glad to learn that it is work which uses our prewar experience to great advantage."

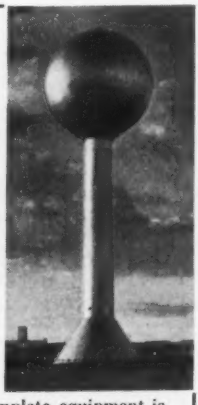
**N. J. Humason,** for the past 20 years Supt. of Filtration at the Elyria, Ohio, Water Works, has been appointed Chief Engineer to succeed the late Albert J. Miller.

**Clyde Downing,** Filter Operator at Wagoner, Okla., for the past six years, has gone to Pearl Harbor to serve in the Navy Supply Depot as Power Plant Engr.

**S. H. Svenson,** Sales Agent for the U.S. Pipe & Foundry Co., has transferred from Buffalo to Kansas City.

(*Continued on page 14*)


# Prevent Rusting



Rusta Restor cathodic protection, provides *permanent protection* against rusting of water tanks, piping and steel structures of all kinds.

Initial cost of a complete equipment is about equal to the cost of a good paint job. . . . Operation costs only about 2 mills (i. e. $0.002) per year per square foot of surface protected.

If your tanks and steel structures are not now protected by this proven low cost method, they should be. No obligation. Send for fully descriptive literature today.

**RUSTA RESTOR**

**Division of**

**THE JOHNSTON & JENNINGS CO.**

**862 Addison Road, Cleveland 14, Ohio**

# PIPE ACCORDING TO THE A. S. A. LAW OF DESIGN

Mono-Cast Centrifugal Pipe can be manufactured in specific weights for specific laying conditions, and in accordance with the recently adopted A. S. A. Law of Design. You get the *exact* pipe your conditions call for.

**PROMPT DELIVERIES with suitable priorities**

**AMERICAN CAST IRON PIPE CO.**

**BIRMINGHAM 2, ALABAMA**

*Sales Offices in Principal Cities*

# IMPORTANT

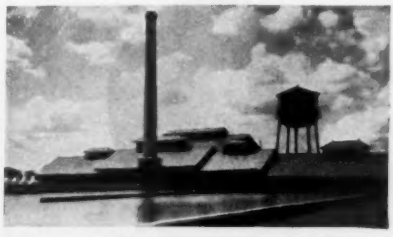
## Public Health must be maintained!

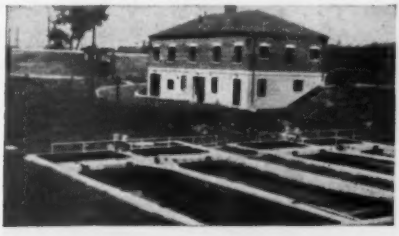
The necessity of maintaining public health in war time is self-evident. Municipal officers in charge of water purification and sewage disposal have a vital responsibility in guarding the nation's health, that should not be underestimated as a contributing factor to final victory.

However, the problems of maintaining public health are *becoming increasingly difficult in the face of material shortages and transportation handicaps.* In order to ease this situation in regard to *Aluminum Sulfate* as much as possible, won't you place your orders as far ahead as you can so that we may schedule our production on an efficient basis.

### Why Most American Cities Prefer General Chemical Aluminum Sulfate

General Chemical Aluminum Sulfate is an especially developed "Alum." High quality and constant uniformity have given it *a time-tested* reputation among water works engineers and sewage plant operators.





★ **FOR WATER WORKS**

1. Makes water crystal clear.
2. Longer filter runs are obtainable.
3. Is economical, used properly will conserve chlorine supplies . . . because it does not require oxidation to make it effective.
4. Superior in tests against other coagulants.
5. High in quality, its constant uniformity can be counted upon.

★ **FOR SEWAGE PLANTS**

1. Clean, easy to handle and economical to use.
2. Simple application, requires only low cost feeding apparatus and minimum attention.
3. Clear, colorless effluents are possible.
4. Precipitated sludge digests readily.
5. Treated digested sludge dries quickly, without odor.

**GENERAL CHEMICAL COMPANY**

**40 RECTOR STREET, NEW YORK 6, N. Y.**

*Technical Service Offices:* Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh Providence (R. I.) • St. Louis • Utica (N. Y.)

*Pacific Coast Technical Service Offices:*

Los Angeles • San Francisco • Seattle, Wenatchee and Yakima (Wash.)

**In Canada: The Nichols Chemical Co., Ltd. • Montreal • Toronto • Vancouver**

(*Continued from page 12*)

**Capt. Vernon L. Walker, Sn.C.,** of Elgin, Ill., was assigned to an infantry division on the West Coast in May, in the capacity of Medical Inspector, after having been Asst. Medical Inspector at Camp Grant, Ill., for 13 months. Capt. Walker was formerly Sr. San. Engr. with the Illinois State Health Dept.

**Capt. James B. Baty, Sn.C.,** has returned from a tour of overseas duty and is now attached to the Surgeon General's Office in Washington, D.C. Before entering the Service in 1942, Capt. Baty was Asst. Prof. of San. Eng., Queen's University, Kingston, Ont.

**Fred F. Williams,** Engr. and Supt. of the Municipal Electric and Water Systems, Poplar Bluff, Mo., for the past six years, has become Supt. of the Electric Plant, Chanute, Kan. Williams, who is a graduate of the Missouri School of Mines and Metallurgy, was a civil engr. for seven years with the Missouri State Highway Dept. He is a member of the Executive Boards of the Missouri Water and Sewage Conference and of the Missouri Assn. of Municipal Utilities.

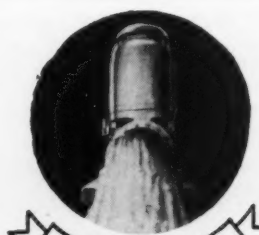
(*Continued on page 16*)

Corrosion's destructive work is on the *inside*. The *RUSTOP System of cathodic rust control* stops under-water corrosion *instantly, completely,* and *permanently* . . . in old tanks or new. No draining, sand blasting, or painting. No service interruptions . . . no taste. Operates for pennies per month. *Guaranteed.*

Write for full information.

ELECTRO RUST-PROOFING CORP., Dayton 10, Ohio.

**RUSTOP** ELECTRO RUST-PROOFING CORPORATION




*The name that speaks Volumes on the Water-front*

**PEERLESS PUMP DIVISION, Food Machinery Corp.**
**301 W. Ave. 26, Los Angeles 31, Calif.**
**1250 W. Camden Ave., S. W., Canton 6, Ohio**
**Other Factories: San Jose 5, and Fresno 16, Calif.**

WF

# Cast Iron Pipe

*Manufactured in Sizes 2" to 96"—*
*A large stock constantly on hand,*
*facilitating prompt shipment.*

**Bell and Spigot Pipe** **Special Castings**

**Flanged Pipe** **Flexible Joint Pipe**

**Short Body B. & S. Specials**

**Warren Spun Centrifugally Cast Iron Pipe**

## Warren Foundry & Pipe Corp.

*and*

**Warren Pipe Co. of Massachusetts, Inc.**

*Sales Offices*
11 Broadway, New York 4, N. Y.
75 Federal St., Boston 10, Mass.

*Works*
Phillipsburg, N. J.
Everett, Mass.

(*Continued from page 14*)

**A letter ballot on postwar water works improvements** at Port Huron, Mich., recently brought a response almost 50 per cent greater than the number of votes cast in the preceding municipal election.

Leonard G. Howell, City Mgr. of Port Huron, sent a letter to his constituents, which said, in part:

City officials also believe that a filtration plant should be constructed which would provide and assure water consumers a pure and wholesome supply of water at all times. The silt and dirt which we have in our water supply during storm periods would be entirely eliminated through filtration. The cost of a filtration plant with a metered water supply would amount to $655,000 or without the use of meters would cost $730,000.

It is the further opinion of city officials that the filtration plant should be constructed without metering the water supply to homes and that the cost of construction should be financed by the issuance of revenue bonds—that is, bonds payable only from revenues from the water department. No increase in tax rate and so far as can now be determined, no increase in water rates would be required. . . .

It is the desire of city officials that those who are to pay for the water works improvements, namely the water consumers, should have an opportunity to express their views for or against the construction of a filtration plant.

(*Continued on page 18*)

Voqt

*Fire Hydrants*

Standard—"Traffic Model"—Flush Type—Water Crane Type

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*Gate Valves*

Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit Any Type Pipe

*Also*—Floor Stands, Shear Gates—Tapping Sleeves and Valves—Flap Valves—Mud Valves

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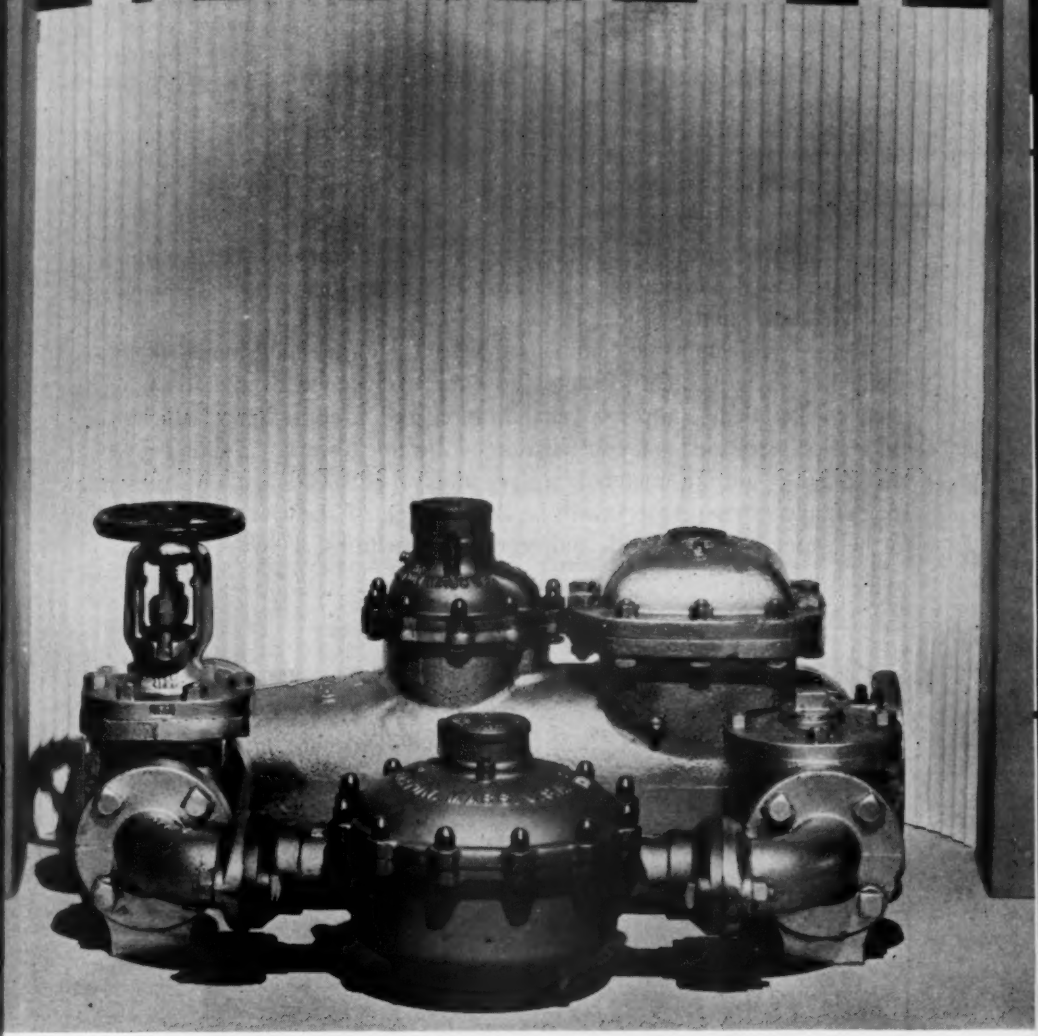
Brothers Manufacturing Co., Inc.
Main at 14th Street, Louisville 3, Ky.

M & H

HIGH QUALITY VALVES HYDRANTS

M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.

# HERSEY



## THE HERSEY DETECTOR METER

**has never been equalled for its accuracy in metering fire services. It always delivers the full capacity of the supply pipe without endangering the pressure. Accepted by Water Works officials. Approved by the National Board of Fire Underwriters.**

**HERSEY MANUFACTURING COMPANY**
**SOUTH BOSTON, MASS.**

**BRANCH OFFICES:**
NEW YORK — PORTLAND, ORE. — PHILADELPHIA — ATLANTA — DALLAS — CHICAGO — SAN FRANCISCO — LOS ANGELES.

(*Continued from page 16*)

There is, therefore, enclosed a ballot on which you are invited and urged to express your views for or against the construction of a filtration plant—without the use of water meters in homes. Please mark your ballot, place it in the enclosed envelope and mail it—without postage—on or before March 18, 1944. All ballots will be opened and tabulated by a citizens committee named by the city commission.

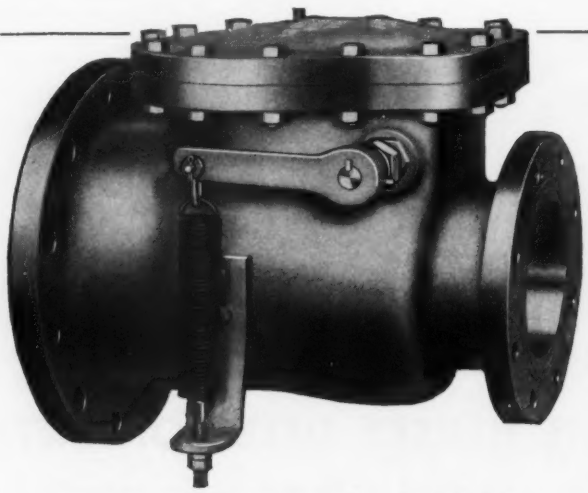
If additional information is desired, you are invited to call at the office of the city manager where the consulting engineer's reports and studies will be made available and any other information gladly furnished.

We want your advice in this matter.

To the question: "Shall the city of Port Huron construct a modern filtration plant—without the use of water meters in homes?" 2,886 people replied, "Yes," and 844 people said, "No."

Other projects to be commenced after the War, and already definitely decided upon by the City Commission are: conversion of the steam water plant to electrical pumping; rehabilitation and fireproofing of the 70-yr.-old pumping station; and construction of 2 water towers. Total cost would be $295,000 with a metered water supply, $380,000 without metering. Incidental to these projects will be the clearing of the river front adjacent to the water plant for park and recreation facilities.

(*Continued on page 20*)



**RENSSELAER**

**LIST 340**

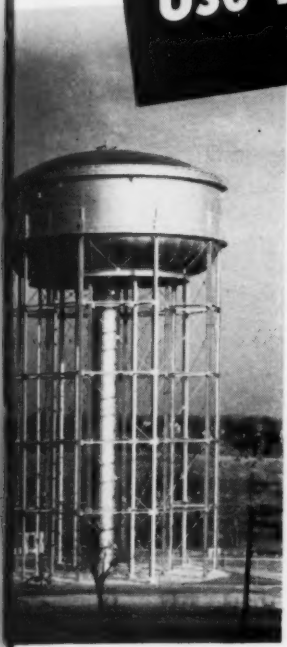
**Clearway Quiet-Closing Check Valves eliminate "SLAM." Made in straight-thru type, as well as expanding outlet type for bolting direct to pump discharge. Write for Bulletin V-1.**

**RENSSELAER VALVE CO. TROY, N. Y.**

# ...UT FIRST THINGS FIRST

## ON YOUR PUBLIC WORKS PLAN—

## Use PITTSBURGH • DES MOINES ASSISTANCE NOW!



**SURVEY** *your improvements needs*

**PROGRAM** *their sequence of importance*

***PLAN** and specify each project in detail*

**FINANCE** *through developed funding methods*

**SCHEDULE** *construction—purchase land or rights*

**BUILD** *when conditions permit!*

Detailed planning of your future construction—in the coming months while time permits—places your community in a position to profit by immediate readiness to build when postwar conditions are ripe. Awaiting your call are the complete engineering facilities of this organization—the understanding and experience gained through 50 years of service to the American municipality. *Write for a consultation.*

Blueprint Now!

**PITTSBURGH-DES MOINES STEEL CO.**

PITTSBURGH, PA., 3424 NEVILLE ISLAND—DES MOINES, IOWA, 925 TUTTLE STREET
NEW YORK, ROOM 921, 251 BROADWAY · CHICAGO, 1228 FIRST NATIONAL BANK BUILDING
DALLAS, 1229 PRAETORIAN BUILDING · SAN FRANCISCO, 631 RIALTO BUILDING
SEATTLE, 1132 EIGHTH AVENUE, SOUTH

COOK Well Strainers

A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.

Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 18*)

The State Supreme Court has ordered Port Huron to build a sewage treatment plant after the War, and this will most probably be paid for by a $6 per year fee to be added to the present $10 per year now billed to Port Huron home owners for water service.

Port Huron is planning to spend a total of $2,850,000 on water, sewerage and drainage improvements to the city.

**Postwar chemical vistas** are painted by the Spring, 1944, issue of *The Chemical Digest*. "Such familiar materials as aluminum, magnesium, toluene, ammonia, formaldehyde, and chlorine are . . . available in unfamiliar abundance." New products of great import to the future chemical world include butadiene, stryrene, acrylonitrile, and pentaerythritol. Output of sulfuric acid and caustic soda has been doubled as a result of accelerated war production. Ammonia will be substantially cheaper after the war as a result of the increase in its production. Toluene production has already increased five times, and toluene will drop in price. "Formaldehyde production," says *The Chemical Digest*, "has soared to high levels that suggest economies in resin production and encourage exploration of possibilities in its derivatives, particularly pentraerythritol." Phenol is now far more abundant than formerly.

"The light metals—" we continue to quote from *The Chemical Digest*, "aluminum, magnesium and their alloys—attain imposing proportions for postwar uses. Output of aluminum is up nearly twelvefold and of magnesium, more than a hundredfold. This increased availability, coupled

(*Continued on page 40*)

**Filter Sand and Gravel**

WELL WASHED AND CAREFULLY GRADED TO ANY SPECIFICATION.
PROMPT SHIPMENT IN BULK OR IN BAGS OF 100 LB. EACH.

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P. O. Box 307, Muscatine, Iowa

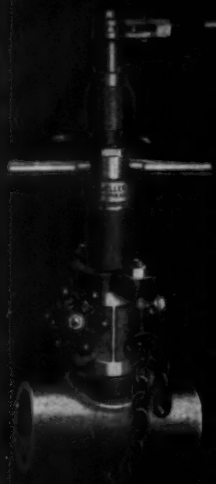
**Bring in a New Member**

HELP PROMOTE YOUR ASSOCIATION BY INTERESTING YOUR FRIENDS AND CO-WORKERS IN IT.

*Send for application blank*

**American Water Works Assn.**
500 Fifth Avenue, New York 18, N. Y.

# USED TO ROUGH STUFF



WATER TAPPING MACHINE "B."

For tapping water mains and inserting corporation stops ¾" to 1" inclusive under pressure. This machine will also make taps only from ⅝" to 2½" inclusive in dry mains.

DRILLING MACHINE "E-4."

For drilling dry or pressure mains through stops, valves or fittings with a capacity of 7-16" to 1" inclusive.

If you are wrestling with Tapping or Drilling problems, you had better take a look at your red Mueller Catalog "H" and investigate the complete line of Mueller Tapping and Drilling Machines.

These machines do many jobs with ease and dispatch. They will drill, tap and insert corporation stops in mains under pressure without shutting down the line or interrupting service. They may be adapted to other purposes such as inserting pipe plugs or will do straight drilling or tapping operations in dry pipe. The small drilling machines will drill through service clamps and corporation stops where the main is too small, weak or thin to permit tapping and the large drilling machines will drill through tapping sleeves and valves for making lateral or branch connections to main under pressure.

Mueller Tapping and Drilling Machines are a necessity for economical installation and maintenance work on water distribution systems. Perhaps you already have a Mueller Machine that has given you excellent service but is now getting a little old. If that is the case, we can recondition it or make you a liberal allowance on a trade-in for a new, up-to-date machine. Write us for the facts today.

●

**MUELLER CO.**

DECATUR, ILLINOIS

"MUELLER"—THE ACCEPTED STANDARD.

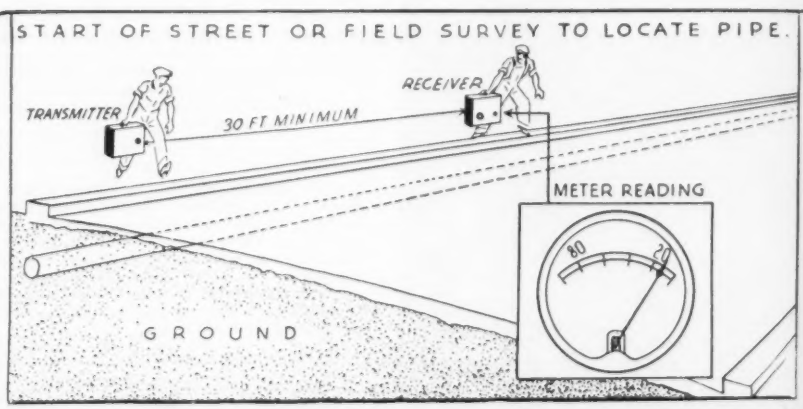
(*Continued from page 20*)

with widespread experience in fabricating these metals and new methods developed for the purpose, clearly indicate their importance [to] the future. . . . Meanwhile, [however,] even the most cursory comparison of production figures shows the light metals so far to be only a little more than 1 per cent of steel output. . . .

"Improved protection of crops from insect pests by less toxic synthetic insecticides seems sure. The techniques of applying insecticides promoted by war—the aerosols and synergistic additions, for example—suggest greater efficiency in the postwar use of many insecticides and indicate clearly the possibilities of further development. . . .

"Protective coating developments include a number of new alkyds of improved properties, semisynthetic and modified drying oils, and the remarkably useful new water emulsion paints based on quick drying alkyds. These last already serve important purposes in painting porous surfaces and seem likely to enter other fields. They are remarkable as requiring a minimum of organic solvent or none at all, yet they yield films in all respects comparable with customary paints."

(*Continued on page 42*)


**M-SCOPE— BURIED PIPE AND CABLE FINDER**

***Exclusively manufactured by the Fisher Research Laboratory***

The M-SCOPE quickly locates the exact position of underground pipe-lines, bends, dead-ends, valves, cast iron bells, stubs, marble obstructions, etc. It determines depth of a pipe-line or metallic conductor. Traces exact course of underground line. It eliminates needless digging and tearing up—saves labor, materials and time.

Write to the Fisher Research Laboratory for latest 16-page booklet explaining the above method.

Please place your order *now* for immediate delivery from our Palo Alto, Calif., or Chicago, Ill., warehouses.

**FISHER RESEARCH LABORATORY**

**PALO ALTO, CALIFORNIA**

NO MORE WATER . . .

It's a hot day on Tarawa, in more than one way for these Marines, in their hastily thrown-up sand bag entrenchments. The canteen is empty — no more water. The smoke of battle, the sticky humidity and a hot, blazing sun all contribute to making this a trying time for these Marines. The heat of the Tarawa engagements made necessary ample supplies of pure drinking water and Navy Medical did a really magnificent job providing pure water supplies often under the most difficult conditions. It is gratifying to us at Hellige to know our instruments are contributing to the job of securing accurately tested water supplies, free from impurities.

HELLIGE, INC., 3718 NORTHERN BOULEVARD, LONG ISLAND CITY, N. Y.

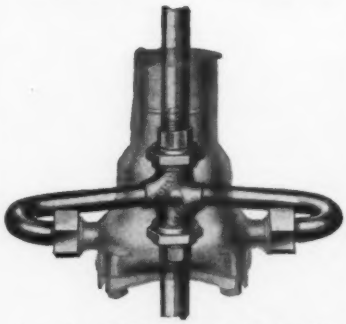
OFFICIAL U.S. MARINE CORPS PHOTOGRAPH

(*Continued from page 40*)

**A gage for measuring sand expansion in filter beds** has been developed by the Builders-Providence Div. of Builders Iron Foundry, Providence, R.I. Accuracy within $\frac{1}{16}$ in. is claimed, and the instrument is portable, easily operated and handled.

The Hook Light Sand Expansion Gage consists of a tube of corrosion-resisting metal sufficiently long to allow the operator to reach the filter bed from the walkway, a handle at the upper end of the tube enclosing dry-cell batteries and a switch, and, at the lower end, a bend in the tube forming a hook, with a small light bulb and magnifying lens. On the side of the tube is an adjustable scale which can be clamped at any height. The operator lowers the tube until the bottom of the bend just touches the top of the unexpanded sand bed. With the unit in this position, he adjusts the scale so that its lowest graduation is in line with a reference mark. During backwashing he raises the instrument until the light can just be observed. Since the scale has been compensated for the distance from the light to the bottom of the bend, the amount of expansion (in inches) is then read directly on the scale.

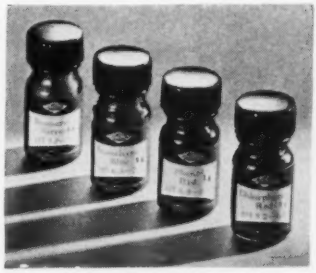
FORGET ME NOT!



I am the COPPERHORN, out for the duration because of the Copper Conservation Order.—BUT I am the best fitting for a basement water meter setting that has been devised to date. Learn more about me and when you plan on your future meter installations, FORGET ME NOT!

FORD METER BOX CO.,
WABASH, IND.

LaMOTTE STANDARDIZED pH INDICATORS



LaMotte pH Indicators are of the highest purity and are unequalled in strength and uniformity. They are supplied in crystalline form and are available for various pH ranges from 0.2 to 10.4. Write for prices.

LaMOTTE CHEMICAL PRODUCTS CO.
Dept. AWA
Towson 4, Baltimore, Md.

1919 · 25TH ANNIVERSARY · 1944

# NEWS OF THE FIELD

**On the cover of this issue** will be found a reproduction of a poster widely used in England as a part of the wartime water conservation campaign.

It has been used in posters and in stickers on correspondence. For England, attacked from the air by planes and by robot bombs, and in constant danger of conflagration, it has served to bring home to the people their individual responsibility for saving water. We pay tribute to our British contemporaries for their fine public relations program which has done so much to make the people active partners in an economy and safety campaign of national importance.

The American Water Works Association has been favored by the cooperation of both the Institution of Water Engineers and the British Water Works Association as organizations and by the personal cooperation of Messrs. Berry, Wildsmith, Rowntree, Wood, Collins and others who have since 1940 made availabe to the JOURNAL all that could be told about the conditions of public water supply in England during the war.

At this time postwar water supply and stream pollution are receiving attention in Parliament, from the organizations of water works executives and of sewage works executives, and from engineers active in both fields.

A national water grid and "piped water in every house" are being discussed pro and con. A review of the subject will appear in a future issue of the JOURNAL because American engineers in water supply and sanitation should know about developments and plans in the United Kingdom. The British concepts may have little or no bearing on practices in North America, but no one can be certain until he knows the facts.

In the meantime, we are grateful for the reaching of hands across the water and salute our British brothers for their dogged courage and good service to the water users of England.

**The Institution of Water Engineers,** the British association of individuals active in the field of water supply, voted at its Annual Meeting in May to apply for Corporate Membership in the A.W.W.A. The president of the organization, Thomas E. Hawksley, will be its representative. The Institution is taking out five extra subscriptions for its sections' libraries. Headquarters for the sections are in Perth, Scotland, and in Halifax, Wolverhampton, Cambridge and Bristol, England.

*(Continued on page 2)*

(*Continued from page 1*)

**A. J. Liebling,** foreign correspondent for *The New Yorker,* told the following story in his *Letter from France,* written July 14, and published in *The New Yorker* for July 22. Major Diggs, hero of the story, was in the Sanitary Corps during the first world war, and operated the Corps' Central Testing Laboratory, which had its headquarters located in Paris.

Cherbourg . . . was the first testing ground in France for the Allies' Army Civil Affairs Branch. When the Americans took over, on June 27th, the city had no water, electricity, gas, transportation or government. The Vichy sous-prefet had fled and so had 25,000 of Cherbourg's civilian population of 40,000. The Civil Affairs team, headed by Colonel Howley, an American, and including both British and American officers, moved in before the street sniping had ended, and immediately started in on the job of resuscitation. The Civil Affairs men's task, as Howley saw it, was to get the city government functioning normally again. The Civil Affairs Branch had no enlisted personnel it could put to work policing the streets or making repairs. Cherbourg had had a fairly modern water system; water was pumped from the little Divette River to a purifying plant, from which it was distributed through mains. Bombs had broken the pipeline from the river to the plant. Major John C. Diggs, a former Sanitary Engineer for the State of Indiana, is Public-Works Officer in the Howley team. He got together the staff of the Cherbourg water system, who told him that the

(*Continued on page 4*)

**Theodore A. Leisen,** Past President of the A.W.W.A., died on July 18 at his son's home at Grosse Pointe Farms, Mich. He was 80 years old.

Mr. Leisen was born and educated in Philadelphia, and at the age of 20 went to the Republic of Colombia to do engineering work on railroads there. After six years he returned to join the water department of Wilmington, Del., where he served from 1890 to 1908. During the last five years of his tenure he was Superintendent and Chief Engineer. From 1908 to 1914 he bore the same titles in his association with the Louisville, Ky., Water Co., and from 1914 to 1923 he served as General Superintendent and Civil Engineer in the Detroit, Mich., Water Department. In 1923 he became General Manager of the Metropolitan Utilities District, Omaha, Neb., from which post he retired in 1939.

During his auspicious career in the Association, which he joined in 1904, Mr. Leisen served twice as Vice-President and twice as a Trustee. He was President in 1918 and a member of the Executive Committee in 1919–20. In 1936–38, he served as a Director, and in 1938 was made an Honorary Member.

During the World War, Mr. Leisen held a commission as major and was in charge of construction at Camp Custer, Mich.

# It pays 5 ways to specify this pipe

When you specify ARMCO Spiral Welded Steel Pipe for new peacetime water mains you are assured these five big advantages:

### 1. Low Installation Cost

Hauling, handling and installation costs are lower; ARMCO Pipe is amply strong without excess weight. Long 50-foot sections mean fewer joints, less assembly work.

### 2. High Flow Capacity

Its spun enamel lining prevents tuberculation—assures highest possible flow capacity.

### 3. Less Leakage

Strong tight joints are assured with any type coupling or by field welding.

### 4. Freedom from Breakage

ARMCO Pipe stretches 25 to 30 per cent before breaking.

### 5. Low Cost Per Year

In the long run ARMCO Pipe costs less per year because of its efficient, reliable service. You can specify it with assurance that it will last as long as you need it.

★ ★ ★

Diameters of ARMCO Pipe are from 6 to 36 inches; wall thicknesses from 7/64 to 1/2-inch. Write us for more information. The American Rolling Mill Company, Pipe Sales Division, 1811 Curtis Street, Middletown, Ohio.

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**MEETS A.W.W.A. STANDARD SPECIFICATIONS**

| *PIPE* | *COATINGS* |
|---|---|
| 7A.3—1940<br>30 inches and larger | 7A.5—1940<br>30 inches and larger |
| 7A.4—1941—TR<br>Up to, but not including 30 inches | 7A.6—1940<br>Up to, but not including 30 inches |

ARMCO

**ARMCO STEEL PIPE**

(*Continued from page 2*)

Germans had taken away all the reserve pipe. He got piping from the Army Engineers, the French installed it with their own workmen, and on July 1st the city had water again. "All they needed was a little encouragement," Major Diggs told me. "I've seen several floods and hurricanes in Indiana and the effect on local governments is always the same—they're a bit stunned, like a man suffering from battle shock. A little shove gets them going again." When it was time to turn the water on, a new problem presented itself, one that it is safe to say nobody in Washington or London had foreseen. There were hundreds of empty buildings in Cherbourg, many of them partly wrecked. The hastily departing owners had left the taps open. When the water was turned on, thousands of gallons would not only be wasted but would do further damage to the structures. Men with loudspeakers borrowed from the local American Psychological Warfare Unit were sent through the streets to warn people to turn off their taps. This expendient did not, of course, take care of the empty houses, so the British Major Palfrey, Police Officer of the team, the American Lieutenant Colonel Hensel, who is its Civil Defense Expert, and the American Lieutenant Davis, who is a former battalion chief in the Columbus, Ohio, fire department, got in touch with the French police, *the Défense Passive,* and the local fire department, respectively, and members of all three services went, just to be sure, to every house in the city and turned off the open taps. Two other officers, Lieutenant Robertson and Captain Westervelt, who were utilities and telephone men in civilian life, got the electric-power and telephone system restored to service in much the same thoroughgoing fashion.*

**Harold A. Kemp** has resigned his post as Head Engr., Office of Chief of Engineers, U.S. Army, to become Director of San. Eng. for the District of Columbia, succeeding the late John Blake Gordon. Between 1934 and 1937, Kemp supervised the design and construction of the sewage treatment plant and the rebuilding of the pumping station for the District, and was Chief Engr. in the San. Eng. Dept. at the time he went to the Army Engineers in 1940. Since graduating from Virginia Polytechnic Inst. with a B.S. degree in 1917, Kemp has been engaged in various private and government engineering projects.

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(*Continued on page 6*)

PALMER *Filter Bed* AGITATORS

Prevent Sand Beds From Cracking
Eliminate Mud Balls
Save Wash Water
Lengthen Filter Runs
Higher Rates of Filtration

ACTIVATED ALUM • BLACKALUM • PALMER FILTER BED AGITATORS
STUART-BRUMLEY CORP., 516 N. Charles Street, Baltimore - 1, Md.

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concentrated sanitation
ready for any emergency

This mobile chlorine carrier's 70% available chlorine swiftly restores sanitary conditions. It effectively destroys bacteria, objectionable odors and other contamination.

Packaged in 5-lb. cans, Sanitation HTH comes in handy for many every-day sanitation jobs, too. It's economical to use — dry and free-flowing. Use HTH for regular treatment of smaller water supplies, sewage effluents, and for efficient sanitizing of swimming pools.

*Write for valuable 80-page handbook*
*"Hypo-Chlorination of Water"*
*Yours without charge.*

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**CHEMICALS**

**THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42nd ST., NEW YORK 17, N. Y.**

Sanitation H T H . . . Liquid Chlorine . . . Ph-Plus . . . Fused Alkali . . . Caustic Soda . . . Soda Ash
Bicarbonate of Soda . . . Bleaching Powder . . . Ammonia, Anhydrous & Aqua . . . Dry Ice
Carbonic Gas . . . Synthetic Salt Cake . . . Sodium Chlorite Products . . . Sodium Methylate

(*Continued from page 4*)

**Earle L. Waterman,** Prof. of San. Eng. at the University of Iowa, has been made head of the Department of Civil Engineering there, succeeding B. J. Lambert, who recently retired. Waterman is Secretary of the Missouri Valley Section, A.W.W.A., and was a Director of the Association in 1939–41.

Waterman graduated in civil engineering from the University of Vermont in 1907 and became Assistant Professor of Hydraulics and Sanitary Engineering at Pennsylvania State College. He was Associate Professor there when he left in 1919 to become Associate Professor of Public Health in the Extension Div. at the University of Iowa. He then became Associate Professor of Sanitary Engineering and was made a full professor in 1925.

During the first world war, Waterman served as captain in the Sanitary Corps.

**Harold F. Rock,** Dist. San. Engr. in the New York State Dept. of Health at Oneonta, N.Y., has been commissioned a lieutenant in the Army and is now Sanitary Officer at Luke Field, Ariz.

(*Continued on page 8*)

**CYANAMID**

*Sulphate of Alumina*

CYANAMID through the control of its basic raw materials can assure you of a uniform high quality product at all times.

It assists in the removal of taste and odor.

It is and remains free flowing.

It is less corrosive than other coagulants.

It does NOT clog the dry feed machine.

It precipitates over a much wider pH range than other coagulants.

Your inquiry is invited on CYANAMID quality Sulphate of Alumina.

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*A Unit of American Cyanamid Company*
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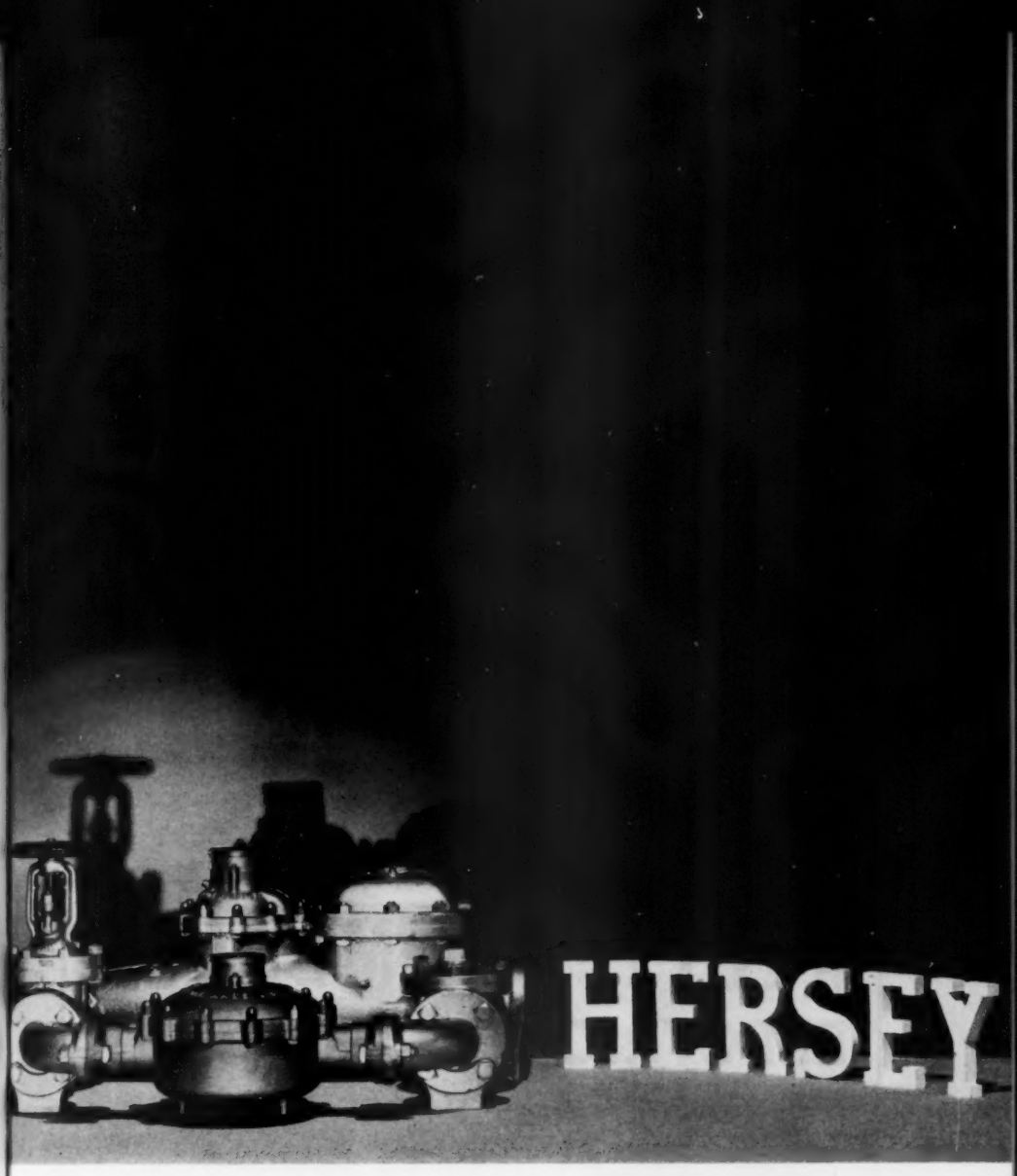
DISTRICT OFFICES: Boston, Mass.; Philadelphia, Pa.; Baltimore, Md.; Charlotte, N. C.; Cleveland, Ohio; Chicago, Ill.; Kalamazoo, Mich.; Detroit, Mich.; St. Louis, Mo.; Azusa, Calif.




## HERSEY DETECTOR METERS

**The accuracy of their performance and unrestricted delivery without impairing the pressure in case of fire, have won the approval of Water Works officials everywhere . . . . . their approval by the National Board of Fire Underwriters is a further check of the dependability of Hersey Detector Meters.**

**HERSEY MANUFACTURING COMPANY**

SOUTH BOSTON, MASS.

BRANCH OFFICES: NEW YORK—PORTLAND, ORE.—PHILADELPHIA—ATLANTA—DALLAS
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(*Continued from page 6*)

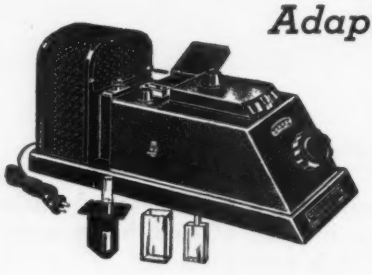
**Norman J. Howard,** Director of Water Purification, Toronto, Canada, and former President of the A.W.W.A., was honored at a dinner and presented with a $500 Victory Bond recently, by his neighbors on Toronto Island. The fete was a tribute to Howard in gratitude for the medical service rendered by him to residents of the Island during the last 30 years. Howard received some medical training in England before becoming an engineer and he volunteers his services as "emergency physician" whenever necessary. He has handled approximately 15,000 cases without charge, as a public service.

**Lt. Comdr. Joe H. Gardner, U.S.N.R.,** of Buffalo, N.Y., is in Washington, D.C., attached to the Office of Procurement and Material, Navy Dept., after having served as a Naval Combat Observer attached to the Marine Corps and participating in the invasion of Kwajalein and Eniwetok Atolls in the Pacific.

Before the war, Commander Gardner was head of the Bingham & Taylor Corp., one of the five oldest Associate Members of the A.W.W.A. He has served on several New York Section committees.

(*Continued on page 10*)

**KLETT SUMMERSON**
**ELECTRIC PHOTOMETER**



***Adaptable for Use in Water Analysis***

**Can be used for any determination in which color or turbidity can be developed in proportion to substance to be determined**

**KLETT MANUFACTURING CO.**
**179 EAST 87th STREET · NEW YORK, N. Y.**

# The One Joint That's All Ready

# Dresser Bellmaster... Style 85

## THE "ONE-PIECE" MECHANICAL JOINT

There are no "bits and pieces" to handle, stock or count with Dresser Bellmasters. This new mechanical joint for cast iron pipe reaches you completely factory-assembled—nothing to put together. It's ready "to go." That is why the industry calls it a "one-piece" joint, for, as far as your workmen are concerned, it is all one-piece.

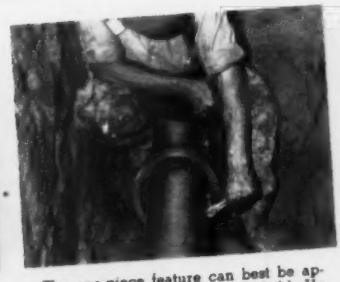
Bellmasters can be stored in the wooden cases in which they are shipped, trucked to the job in these same containers and excess joints returned to the stockroom in the same boxes.

But ease in handling and storing is only one of the many advantages of Bellmasters. They are, without question, the simplest, easiest and fastest to install. Take a Bellmaster from its original shipping case—insert it in the bell, "stab in" the spigot end and tighten the capscrews. That is all there is to it. The only tool needed is a wrench. Your newest workman will average less than 5 minutes to a joint. And he will make a bottle tight, corrosion-protected, flexible joint that will last as long as the pipe.

Plan now to standardize on Bellmasters for cast-iron pipe. You will find they save you time, money, trouble. Specify Bellmaster end pipe as present inventories run out. Your regular source can usually supply you promptly.

Assembly with pneumatic air hammer. This Dresser workman is putting what is needed into the Bellmaster, the only self-contained, one-piece, pipe joint.

Bellmasters leave the factory well-protected and arrive at the storehouse in a compact, easy-to-store box.



The one-piece feature can best be appreciated by the man in the field. He has only one piece to handle and he can really make time.

*In Canada: Dresser Manufacturing Co., Ltd., 60 Front St., West, Toronto, Ont.*
*Houston Office and Warehouse: 1121 Rothwell St., Houston, Texas*

**DRESSER** MANUFACTURING COMPANY • BRADFORD, PA.

ONE OF THE DRESSER INDUSTRIES

(*Continued from page 8*)

**Jeptha A. Wade,** Chief Engineer of the California Water Service Co., San Jose, Calif., died at San Mateo on July 4 after a long illness.

Mr. Wade was born in Eaton, Mich., in 1887, and graduated from Olivet College in 1908. He received a civil engineer's degree from the University of Michigan in 1913. During the World War he designed at Nitro, W. Va., one of the largest pumping stations constructed during that period. He subsequently planned the reconstruction of the pumping stations at Harrisburg, Pa. He was also on the staffs of James H. Fuertes, Consulting Engineer, New York City, and Graham, Anderson, Probst and White, Consulting Engineers, Chicago. From 1926 to 1933 he was associated with the Federal Water Service Co., an organization having various enterprises in South America. He went to the California Water Service Co. in April 1933.

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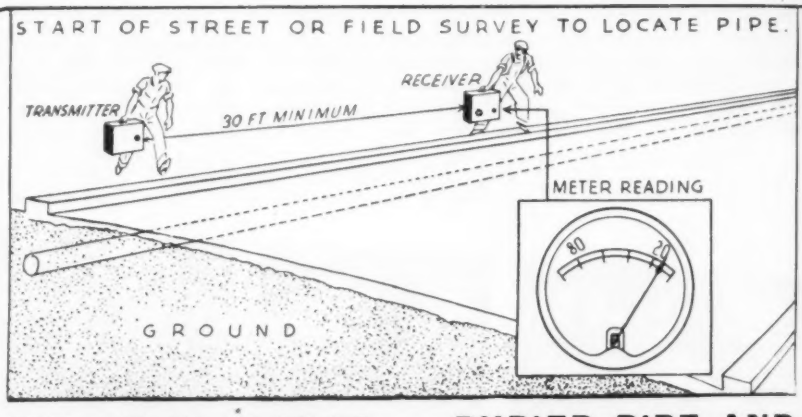


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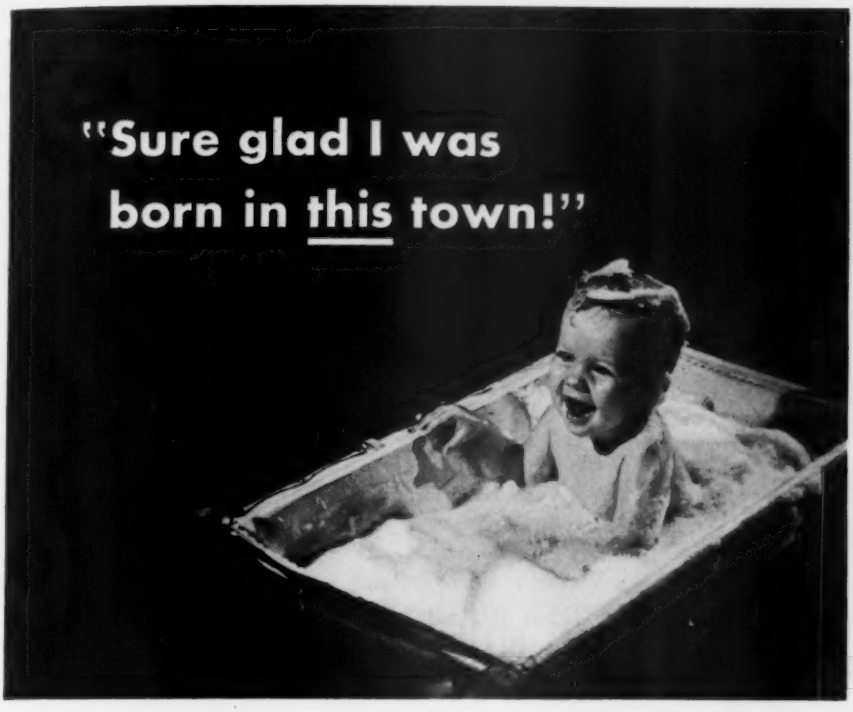
Write to the Fisher Research Laboratory for latest 16-page booklet explaining the above method.

Please place your order *now* for immediate delivery from our Palo Alto, Calif., or Chicago, Ill., warehouses.

**FISHER RESEARCH LABORATORY**

**PALO ALTO, CALIFORNIA**




**Good water makes happier, healthier communities . . . plan it now!**

NEXT to the air they breathe, water is about the most important of your citizen's needs. It's Public Utility Number One—and its quality can decide whether or not your community will be happy and prosperous. Hundreds of modern cities realized this before the war—and installed Permutit* equipment to give them soft, clear water from every faucet in town.

Forward-looking city officials are planning *now* for good water as their most important post-war improvement. Get the facts about Permutit's more practical, more economical equipment for municipal water conditioning. Write to The Permutit Company, Dept G2, 330 West 42nd Street, New York 18, N. Y. In Canada: Permutit Company of Canada, Ltd., Montreal.

*Trademark Reg. U. S. Pat. Off.

**PERMUTIT**

WATER CONDITIONING HEADQUARTERS

(*Continued from page 10*)

**John Blake Gordon,** 64, Director of Sanitary Engineering for the District of Columbia, died this spring after a heart attack.

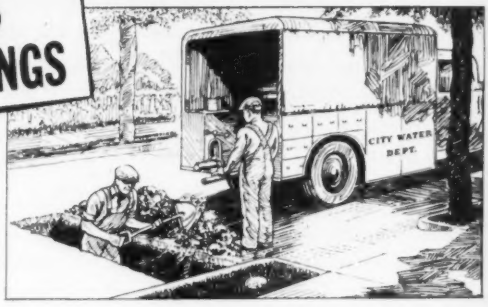
Mr. Gordon served with the District from the time of his graduation from Columbian College (now George Washington University), with B.S. and C.E. degrees, in 1900, except for a period from 1905 to 1910 when he was associated with various private concerns, and from 1917 to 1919 when he was in France as an Engineering Officer. He became Director of Sanitary Engineering in 1932. During his tenure, Mr. Gordon directed the expenditure of $20,000,000 by the Department.

**Warren H. Booker, San. Engr. (R),** U.S. Public Health Service, has been "loaned" to the Texas State Health Dept., which in turn has assigned him to the City of San Antonio, where he is serving as City San. Engr. Booker was formerly Director of the Div. of Sanitation in the North Carolina State Board of Health, Raleigh.

(*Continued on page 14*)

*Avoid Expensive Replacements*

use HAYS STOPS and FITTINGS




THE annoyance, inconvenience and expense of replacing fittings for underground installations, such as corporation stops and curb stops, can be prevented by installing Hays materials. Hays has specialized in the manufacture of water works materials for more than seventy-five years and has the knowledge and experience to make recommendations for all types of installations, regardless of climatic or geological conditions.

Hays stops are made for use with iron, copper, or lead pipe.

Hays modern facilities and equipment including foundry, machine shops, finishing and testing departments, together with an excellent engineering and research staff is your assurance of the finest quality in Water Works Materials.

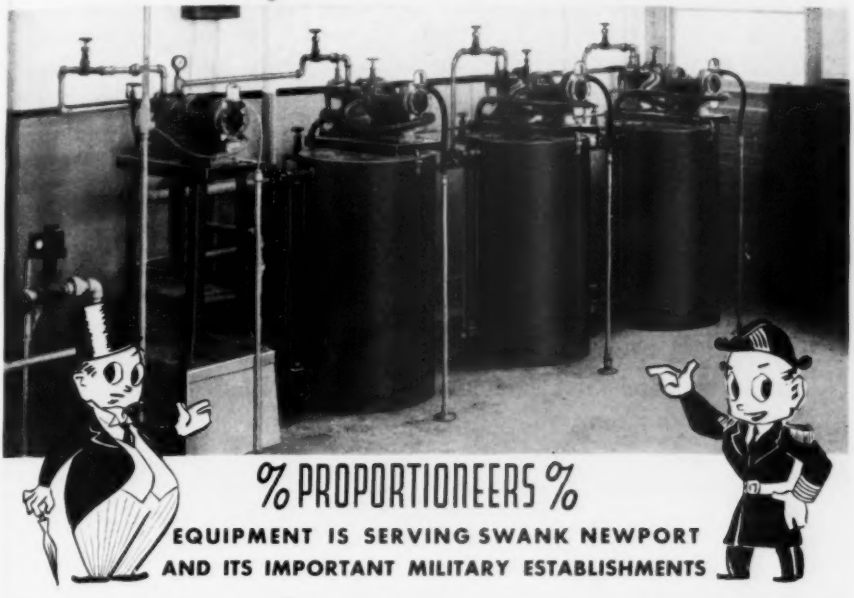
For complete information regarding Hays Water Works Products contact your nearest Hays distributor or write us direct.

OUR SEVENTY-FIFTH ANNIVERSARY

HAYS MANUFACTURING CO., ERIE, PA.

SINCE 1869

# ..at Newport, Rhode Island



% PROPORTIONEERS %

**EQUIPMENT IS SERVING SWANK NEWPORT AND ITS IMPORTANT MILITARY ESTABLISHMENTS**

Four hydraulically operated manually controlled "Proportioneers" Chem-O-Feeders, illustrated above, are installed in the chemical feed room at the new Lawton's Valley Plant of the City of Newport where they are feeding aqua ammonia for taste and odor control with conspicuous success. The 26° BE aqua ammonia is forced by compressed air from a 500 gallon underground storage tank into three individual fume-proof dilution tanks, shown above, where it is diluted with water, 9 to 1 in one of the tanks, and 18 to 1 in the others. One Chem-O-Feeder is used for pre-ammoniation and two for post-ammoniation of the discharge from 1400 and 2800 gallon per minute pumps. The fourth feeder will soon be in use feeding Calgon to the plant effluent for corrosion control

"Proportioneers" is prepared to handle your postwar ammoniation and Calgon feeding problems, whether your plant is smaller or larger than the Lawton's Valley Plant at Newport which is now operating at four and a half million gallons per day. Write today for our recommendations.

## % PROPORTIONEERS, INC. %

**61 CODDING ST., PROVIDENCE 1, R. I.**

(*Continued from page 12*)

**William T. Bailey,** Chief Engineer and Superintendent of the Kansas City Water Department, died there on July 18.

Mr. Bailey was born in Kirksville, Mo., in 1900. Upon graduating in 1927 from the University of Iowa, where he was elected to Phi Beta Kappa, he joined the Council Bluffs, Iowa, Water Department as Chief Chemist. He was later put in charge of the purification and pumping plant there. He left on April 15, 1942, to become Assistant Chief Engineer and Superintendent at Kansas City. In August 1943 he succeeded to the post of Chief Engineer and Superintendent when Melvin P. Hatcher became Director of the Department.

Mr. Bailey joined the A.W.W.A. in January 1932, and served as Chairman of the Missouri Valley Section in 1942, the same year that the Section honored him with the Fuller Award for "his outstanding work in the operation of the Council Bluffs Water Treatment Plant, his contributions to the field of water purification, and his participation in community activities."

At the time of his death, Mr. Bailey was working on plans for the installation of new carbon dioxide equipment for the Kansas City water softening system.

**Carl Wyant,** Resident Engr. and Gen. Mgr. of the Montecito County Water District, Santa Barbara, Calif., has retired because of ill health. Wyant had been Chief Engr. of the Water District since its inception in 1923. A tunnel through the mountain range adjacent to the district, the Juncal Dam on the Santa Yuez River, and the Montecito Valley water system, including 11 reservoirs and the distribution system, were constructed under his supervision.

(*Continued on page 16*)

**Filter Sand and Gravel**

WELL WASHED AND CAREFULLY GRADED TO ANY SPECIFICATION.
PROMPT SHIPMENT IN BULK OR IN BAGS OF 100 LB. EACH.

**Inquiries Solicited.**

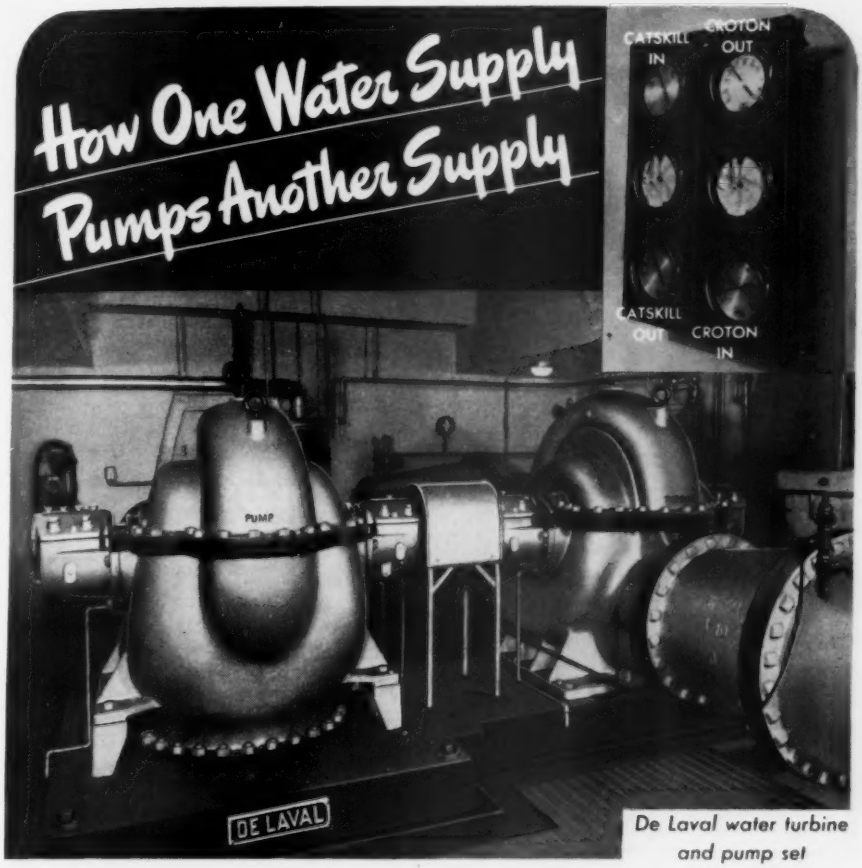
**Northern Gravel Co.**
**P. O. Box 307, Muscatine, Iowa**

**Bring in a New Member**

HELP PROMOTE YOUR ASSOCIATION BY INTERESTING YOUR FRIENDS AND CO-WORKERS IN IT.

*Send for application blank*

**American Water Works Assn.**
**500 Fifth Avenue, New York 18, N. Y.**




*De Laval water turbine and pump set*

The De Laval Water Turbine and Centrifugal Pump set here shown is located in a room beneath one corner of the Public Library, 40th St. and Fifth Avenue, New York City. At full capacity the water turbine, receiving 20,800 g. p. m of Catskill water under 210 ft. head and discharging to its distribution system against 120 ft. head, drives a pump operating at 560 r. p. m., which delivers 21,000 g. p. m. of Croton water to its distribution system against 100 ft head. The positive head at the suction nozzle is 35 ft. and 392 hp. is delivered by the water turbine

The speed of the unit is automatically regulated by a hydraulically operated throttle valve in the turbine discharge line, actuated by the pressure therein. No particular attention is necessary other than occasional inspection of the lubricating system

De Laval engineers will gladly help in solving your pumping problems.

4107

DE LAVAL Steam Turbine Co.
TRENTON, N. J.

MANUFACTURERS OF TURBINES . . . STEAM, HYDRAULIC PUMPS . . . CENTRIFUGAL, CLOGLESS, ROTARY DISPLACEMENT, MOTOR MOUNTED, MIXED-FLOW, PROPELLER, PRIMING SYSTEMS, CENTRIFUGAL BLOWERS and COMPRESSORS, GEARS . . . WORM, HELICAL and FLEXIBLE COUPLINGS

(*Continued from page 14*)

**Martin V. M. Symons,** Chief Engineer of the Interstate Water Co., Danville, Ill., passed away this spring at the age of 79. He had been associated with the Danville water supply since 1895.

According to his son, George Symons, in *Water Works and Sewerage,* Martin Symons, at the age of nine, "fired his first boiler, at twelve he was operating a mill, and in the next several years he learned the millwright's trade. Before he was twenty [he] built the first A-frame dam west of the Allegheny mountains. The first Indiana Turnpike was put down under his supervision and then he turned to strawboard mills." When Mr. Symons "went into the [Danville] plant two pumps of about 2 mgd. capacity supplied an untreated river water to a relatively few consumers who let the mud settle in the glass before drinking. [Mr. Symonds] installed one of the first mechanical Jewell rapid sand filters, new and larger pumps, coagulation, first with lime and 'iron,' then alum. Hypochlorite was adopted about 1910 and one of the first silver diaphragm Wallace and Tiernan chlorinators went into service about the time of World War I. Four different dams, more pumps, new and larger boilers, a laboratory, . . . clor-amination, activated carbon, and break-point chorination" were all added by Mr. Symons.

Mr. Symons joined the A.W.W.A. in 1915, and was active at meetings of the Illinois Section and the Illinois Filter Operators Association.

**Deming Bronson,** steel pipe protection specialist, Cleveland, Ohio, has resigned from the Vice-Presidency of the Hill-Hubbell Div., of the General Paint Corp. He had served in the post for fifteen years. He is now occupying offices in the Rockefeller Bldg., Cleveland Heights.

(*Continued on page 18*)

*Judged the Most Popular*

**ACTIVATED ALUM**

**BLACKALUM**

**PALMER SURFACE WASH SYSTEMS**

**STUART-BRUMLEY CORP.,**
**516 N. Charles Street, Baltimore - 1, Md.**

# SIMPLEX

## INCREASE FLOW CAPACITY 40% TO 60%

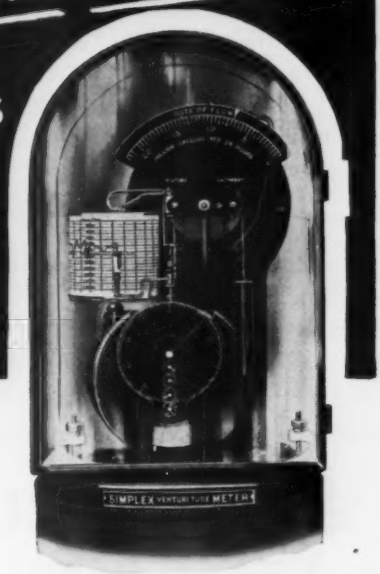
**MOL or MOLA METERS**

with flow ranges

FROM **20 to 1**

TO **28½ to 1**

OR TO **40 to 1**




**Two typical examples of the ease and economy of increasing the maximum capacity of flow lines with the use of Simplex MOL and MOLA wide-range meters are given below:**

1. **A change in operating heads enabled a large municipal water department to increase the total capacity of one of their pumps from a maximum of 60 million gallons per day to 72 million gallons per day by replacing the existing Simplex MO Meter with a Simplex MOL Meter. No change in the Venturi Tube, Pump Impeller, or motor was required, and operating costs showed a marked decrease.**
2. **By substituting an MOLA Meter for an MO Meter, increased requirements were met without any change in the Venturi tube, permitting an increase of from 13 million gallons per day to 21 million gallons per day.**

**Simplex MOL and MOLA meters are designed to function over extremely wide flow ranges — and the accuracy of measurement and totalization is maintained at both maximum and minimum ends of the range.**

**Look into the advantages and economies of making use of Simplex instruments for performing the extraordinary as well as the conventional metering operation.**

*Write today; our recommendations are made without obligation.*

**SIMPLEX VALVE & METER CO.**

**6784 UPLAND STREET, PHILADELPHIA 42, PA.**

(*Continued from page 16*)

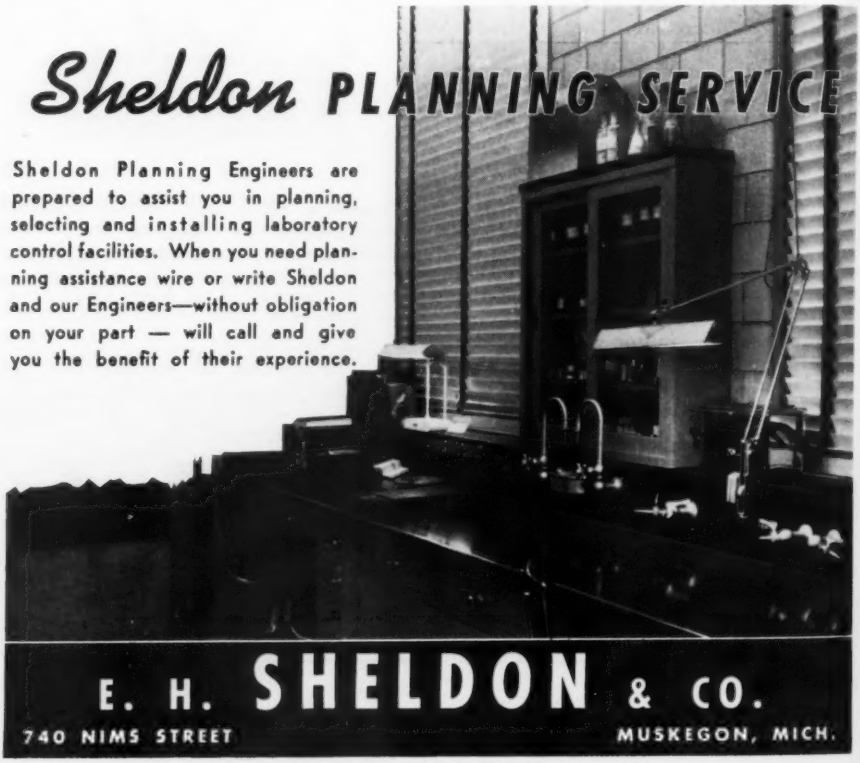
**Edgar H. Bristol,** President of the Foxboro Co., Foxboro, Mass., and one of its founders, died unexpectedly of a heart attack on July 24.

After completing his high-school education, Mr. Bristol became a machinist, then a tool-maker and subsequently production manager in the instrument company of which his father was president. With his brother, Bennet B. Bristol, he withdrew in 1908 to organize the Industrial Instrument Co., which, on Jan. 1, 1914, became the Foxboro Co. Mr. Bristol served as its president throughout its history.

More than 40 patents were recorded to Mr. Bristol's credit, including one on the helical spring, which is the measuring element in temperature and pressure recorders.

**Robert H. Conk,** Chemist and Bacteriologist of the West Palm Beach, Fla., Water Co., is now serving as a Lieutenant Colonel in Field Artillery and is stationed somewhere in the Asiatic Theater.

(*Continued on page 20*)


Sheldon PLANNING SERVICE
Sheldon Planning Engineers are prepared to assist you in planning, selecting and installing laboratory control facilities. When you need planning assistance wire or write Sheldon and our Engineers—without obligation on your part — will call and give you the benefit of their experience.
E. H. SHELDON & CO.
740 NIMS STREET
MUSKEGON, MICH.

# FOR MUNICIPAL *and* INDUSTRIAL PLANTS

## THE DORRCO HYDRO-TREATOR
### *A SELF-CONTAINED* WATER TREATMENT UNIT

The Dorrco Hydro-Treator combines in one unit the three well-established steps of water treatment—Flocculation, Thickening and Clarification—which are performed in sequence in three separate zones extending from the bottom to the top of the unit.

Forty-two Dorrco Hydro-Treators are producing pure water to exacting specifications in 25 plants throughout the country ranging in flows from 40 to 0.10 M.G.D. They are being used for the following purposes:

1. Coagulation for Removal of Turbidity and Color
2. Lime and Lime Soda Softening
3. Iron Removal
4. Algae Removal
5. Silica Removal
6. Magnesia Recovery from Sea Water
7. Brine Purification
8. Oil Well Brine Treatment
9. Oil Refinery Waste Water Treatment

● Write to our nearest office for a copy of the new Hydro-Treator Bulletin No. 9041 which gives details of construction and operation of the unit and contains several pages of graphs, tables and formulae useful to water technologists.

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ADDRESS ALL INQUIRIES TO OUR NEAREST OFFICE

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RESEARCH AND TESTING LABORATORIES . . . . . WESTPORT, CONN.
SUGAR PROCESSING: PETREE & DORR DIVISION, 570 LEXINGTON AVENUE, NEW YORK 22

(*Continued from page 18*)

**W. E. Yow,** for the past ten years Supt. of the Asheboro, N.C., Water Dept., has been appointed City Manager there. Under Yow's administration, the city is making its postwar plans to include additional water supply, for which plans and specifications are ready, and an extension of the water distribution system.

**Clyde E. Williams,** City Civil Engr. of South Bend, Ind., has opened new and enlarged offices for his consulting practice in South Bend. Williams, who holds a B.S.C.E. degree from the Univ. of Michigan, was with the City of South Bend from 1927 to 1933 as Asst. Engr., then went to the Indiana State Board of Health with the same rating. In 1935–36, he was Asst. State Director of Indiana Community Sanitation under the U.S. Public Health Service. He returned to the Indiana State Board of Health for two years, then assumed his present position with the City of South Bend.

**Keith R. Chinn,** Plant Supt., West Palm Beach, Fla., Water Co., has become a Captain in Military Intelligence, stationed in Washington, D.C.

(*Continued on page 24*)

METER BOX COVERS

Ford Meter Box Covers are made in a variety of types and sizes for all conditions. Double-lid covers have air-space insulation and sloping skirts which cut down heat loss to a minimum. Single lid covers have overlapping or inset lids and are made in several depths and lid sizes. All Ford Covers have the Lifter Worm Lock and are made to give a lifetime of satisfaction. Write for our catalog of better equipment for water meter setting and testing.

FORD METER BOX CO.
WABASH, IND.

WATER REFINING EQUIPMENT HEADQUARTERS
INDUSTRIAL—PROCESS
RAILROAD—MUNICIPAL—HOUSEHOLD

**FILTERS** Of All Types *and* Capacities . . . Gravity . . . Pressure

**SOFTENING SYSTEMS**
All Types *and* Capacities—Zeolites (*synthetic and natural*) and Lime and Soda

**CHEMICAL FEEDERS** (wet or dry)
Acids . . . Hypochlorites . . . Alkalies

**EQUIPMENT FOR REMOVAL**
Of Iron . . . Taste . . . Odors . . . Colors . . . Suspended Matter

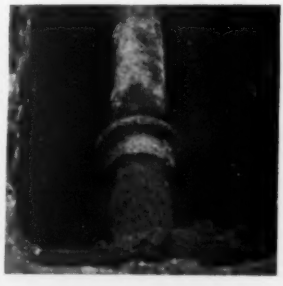
SWIMMING POOL EQUIPMENT
AERATORS · DE-GASIFIERS
WATER TEST SETS
RE-CARBONATORS

The AMERICAN WATER SOFTENER COMPANY
WATER REFINING EQUIPMENT HEADQUARTERS
INDUSTRIAL · PROCESS · RAILROAD · MUNICIPAL
HOUSEHOLD, ETC.
322 LEHIGH AVE., PHILA., PA.

# the first steamship crossed the Atlantic-

## *St. Louis laid a cast iron main which is still in SERVICE . . .*

*Charleston, S. C.* This cast iron main is still functioning after 106 years of continuous service.



*Lynchburg, Va.* This 115-year-old main, still in service, is the second-oldest cast iron water main in America.

THE late Justice Holmes once said that "a page of history is worth a volume of logic." In this advertisement are shown unretouched photographs of cast iron pipe, in service in the ground, temporarily uncovered for inspection, which have a history of 100 years or more of continuous service.

Why are pipe materials other than cast iron generally referred to as substitutes for cast iron? Because cast iron pipe is the *standard* as well as the *only* material for underground mains with a history of long life—a century or more in this country—two centuries or more, abroad.

But, far from resting their case on history alone, the makers of cast iron pipe can point to outstanding accomplishments in product development. The production of cast iron pipe today is on a scientific basis with laboratory controls at every step from raw materials to finished pipe. So, whether you are laying cast iron pipe now, or specifying it now for post-war construction, you can be sure it will not only live up to its history, but improve on it.

CAST IRON

Cast Iron Pipe Research Association

Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago 3

**CAST IRON PIPE**
**SERVES FOR CENTURIES**

COOK Well Strainers

A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.

Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 20*)

**Capt. Clyde R. Harvill, Sn.C.,** now in the European Theatre wrote by V-Mail on July 27, "I am the Sanitary Engineer on the Surgeon's Staff of a Base Headquarters in England. We are now awaiting a 'short boat trip' which we expect to be in the near future. My duties include water supplies and their treatment, waste disposal and related sanitary problems. . . . I had the opportunity of seeing the water supplies of a large portion of this part of England and . . . they were most interesting, to put it mildly. We are expecting to find the work on the continent of a different nature from that encountered here, but [it] should also be of interest.

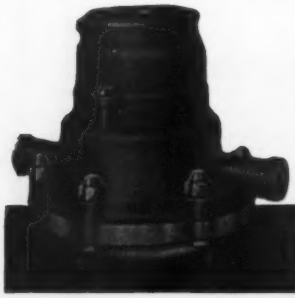
"I am looking forward to the time [when] I can get back to my old job at Houston, Texas, where I was for some fifteen years before I got in the Army. It is one of the things most of us do—think about things back home and what we will be doing when we get back."

Captain Harvill has been in the Army two years and went overseas this spring.

**Henry P. Stockwell, Jr.,** Chemical Engr., Water Purification Plant, Ottawa, Canada, has been appointed Assistant Water Works Engineer, succeeding C. D. Wight, who has been made Assistant Commissioner of Works. Stockwell holds a B.S. degree from McGill University, and had varied experience in chemistry in private organizations before becoming Chemical Engineer for Ottawa in 1932.

(*Continued on page 28*)

NIAGARA IRON CASE WATER METERS



provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

WRITE FOR CATALOG.

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Established 1892 2914 Main St., Buffalo, N. Y.

## METCALF & EDDY

*Engineers*

Water, Sewage, Drainage, Refuse
and Industrial Wastes Problems
Airfields Valuations
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**Statler Building, Boston F16**

## ROBERT T. REGESTER

*Consulting Engineer*

Sewerage—Sewage Treatment
Water Works—Industrial Wastes
Flood Control—Fire Protection
Advisory Service, Reports and Designs

**Baltimore Life Building**
**BALTIMORE 1, MD.**

## MURRAY LABORATORY

*Consulting & Analytical Chemist—Bacteriologist*

Municipal & Industrial Water Supplies
Bacteriological—Chemical—
Sanitary—Mineral Analyses
Reports & Treatment Recommendations

**Capers Bldg. Greenville, S. C.**

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Dams, Water Supply, Sewers,
Sewage Disposal
Structures
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Water Waste Surveys, Trunk Main
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Dams Water Works Sewerage
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**142 Maiden Lane, New York 7**
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**Avenida Presidente Wilson 164,**
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Water Supply, Treatment, Sewerage,
Reports, Plans, Estimates,
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Water Supply and Purification; Sewerage,
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Reports, Designs, Supervision of Construction and Operation; Valuations.
Chemical and Bacteriological Analyses

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Water Waste Surveys
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Penstock Gaugings

**50 Church St. New York 7, N. Y.**

## WHITMAN, REQUARDT & ASSOCIATES

*Engineers Consultants*

Civil—Sanitary—Structural
Mechanical—Electrical
Reports, Plans,
Supervision, Appraisals

**1304 St. Paul St. Baltimore 2, Md.**

(*Continued from page 24*)

**Maj. F. G. Wightman, R.C.E.,** will return to civilian life at the end of four years' military service in December. He will become Engr. and Supt. of the Amherst, N.S., water supply. Before the war, Major Wightman was Town Mgr. of Kentville, N.S.

**Milton M. Bowen,** of Chicago, previously Special Repr. of the Hill-Hubbell Div. of the General Paint Corp., and Mgr. of the Eastern Div. in charge of Pipe Wrapping, has been appointed Vice-President to succeed Deming Bronson, who recently resigned. Bowen will now make his headquarters in Cleveland.

**Reorganization of the Public Service Commission of Indiana** will be of interest to readers of the JOURNAL who have been following the activities of the Association's Committee on Water Works Depreciation. It will be noted in the following excerpt from Public Utilities Fortnightly for August 3 that the member of the Commission who resigned did so because he objected to the assumption of the functions of the state commission by a federal bureau:

(*Continued on page 32*)

**Prevent Rusting**

Rusta Restor cathodic protection, provides *permanent protection* against rusting of water tanks, piping and steel structures of all kinds.

Initial cost of a complete equipment is about equal to the cost of a good paint job. . . . Operation costs only about 2 mills (i. e. $0.002) per year per square foot of surface protected.

If your tanks and steel structures are not now protected by this proven low cost method, they should be. No obligation. Send for fully descriptive literature today.

**RUSTA RESTOR**
Division of
THE JOHNSTON & JENNINGS CO.
862 Addison Road, Cleveland 14, Ohio

*To bring the boys back home*

*Buy War Bonds and Stamps*

*To provide jobs for the boys when they get back home*

*Blueprint Now!*

Designed to give the *maximum pressure differential* or lift with the *minimum resistance*, the glider's wing is very similar in engineering principle to a Builders Venturi Tube. Exhaustive tests have perfected the contour of the Venturi Tube to deliver the *maximum pressure differential* with *minimum resistance* (loss of head) and to give high performance in the measurement of flow.

SPECIFIC ADVANTAGES OF VENTURI METERS

**• LOW PRESSURE LOSS**
The pressure loss through a Venturi Tube, and thus the cost of pumping or the retardation of gravity flow, is much less than incurred by an orifice plate or conventional flow nozzle producing equivalent differentials.

**• LONG LIFE**
Durability and accuracy are built into Venturi Meters. Frequently they outlive two or more "generations" of companion equipment.

**• LOW COST PER YEAR**
If the initial cost and the cost of maintenance during the useful life of the Venturi Meter are totaled and averaged, the resulting cost per year is insignificant.

**• UNINTERRUPTED SERVICE**
The flow through the Tube does not have to be shut off to adjust or repair the Instrument.

**• CORRECT INSTALLATION ASSURED**
As the Venturi Tube is a complete unit, precisely machined and assembled in the factory, the possibility of inaccurate performance due to faulty or careless installation is eliminated.

**• SHORT APPROACH PIPE**
Standard Venturi Tubes, having inlet and throat pressure averaging annular chambers and wall-guided flow stream throughout, are less affected by upstream disturbance than are orifice plates, pitot tubes, or conventional flow nozzles. They, therefore, require only a short length of straight approach pipe and permit any kind of fitting at the outlet.

**• NO MECHANISM IN THE LINE**
The Venturi Tube, which forms a section of the pipe line, contains no inwardly projecting or moving parts.

**• SELF-CLEANING**
Rapidly accelerating velocity toward and through the throat of the Venturi Tube insures free passage of silt and solids, maintaining a clear interior.

**• ACCURACY CAN BE CHECKED**
Instrument readings can be verified at any time by comparing with a mercury column or "test pipe" attachment.

**• ENDURING ACCURACY**
The smooth bronze or stainless steel throat of a Venturi Tube retains its original surface and dimensions, and hence its original accuracy, for years.

*For Bulletin 143A describing the construction of Venturi Meter Tubes, address Builders-Providence, Inc., (division of Builders Iron Foundry), 9 Codding St., Providence 1, R. I.*

"BLUE PRINT NOW"

*Sincerely Yours,*
BUILDERS-PROVIDENCE

(*Continued from page 28*)

Hugh Abbett, Oklandon, Chief Engr. for the State Public Service Commission for the past two years, last month was appointed a member of the Commission by Governor Henry F. Schricker.

He succeeded William A. Stuckey, Democratic member, who resigned on July 6th after a brief conference with the governor. It was reported several weeks ago that Mr. Stuckey would not be reappointed because of differences with George N. Beamer, South Bend, Commission Chairman.

Mr. Stuckey issued a statement following his resignation in which he asserted the functions of the state commission are being superseded by Federal bureaus and reviewed his disagreements with Mr. Beamer in both commission and political affairs.

Mr. Abbett first was appointed to the Eng. Dept. of the Commission in 1919. In 1934 he became chief engineer for a public utility consultant in New York, and worked in Alabama, Louisiana, and Illinois. He then became associated with the Federal Power Commission in 1938 and four years later was appointed Chief Engineer of the Commission.

Mr. Stuckey's resignation became effective at noon on July 8th.

George M. Barnard, New Castle and Indianapolis, Republican member of the Commission, is expected to resign shortly when his appointment to the Interstate Commerce Commission recommended several weeks ago by President Roosevelt, is approved.

(*Continued on page 36*)

Corrosion's destructive work is on the *inside*. The *RUSTOP System of cathodic rust control* stops under-water corrosion *instantly, completely,* and *permanently* . . . in old tanks or new. No draining, sand blasting, or painting. No service interruptions . . . no taste. Operates for pennies per month. *Guaranteed.*

Write for full information.

ELECTRO RUST-PROOFING CORP., Dayton 10, Ohio.

RUSTOP ELECTRO RUST-PROOFING CORPORATION

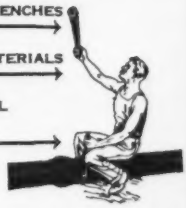
3 *Money, Time and Labor Saving Features of*

UNIVERSAL CAST IRON PIPE

LAID WITH ONLY WRENCHES

NO CAULKING MATERIALS

NO GASKETS. NO BELL HOLES TO DIG.



For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.

*Dept. C*
THE CENTRAL FOUNDRY COMPANY
386 FOURTH AVENUE, NEW YORK 16, N. Y.

Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.

NAME _____

STREET _____

CITY _____

# 1879—ROSS—1879

## *Blueprint Now!*

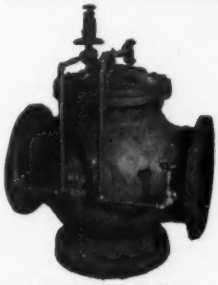
ALTITUDE VALVE

Controls elevation of water in tanks, basins and reservoirs

1. Single Acting
2. Double Acting

Maintains safe operating pressures for conduits, distribution and pump discharge

SURGE-RELIEF VALVE



REDUCING VALVE

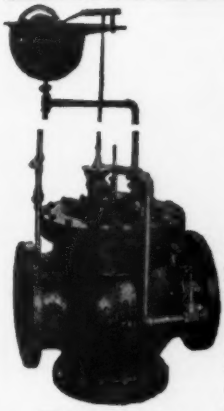
Maintains desired discharge pressure regardless of change in rate of flow

Regulates pressure in gravity and pump systems; between reservoirs and zones of different pressures, etc.

A self contained unit with three or more automatic controls

COMBINATION VALVE

Combination automatic control both directions through the valve.

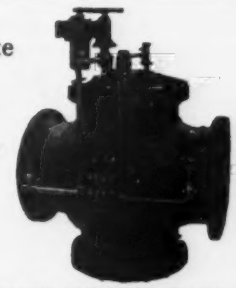


FLOAT VALVE

Maintains levels in tank, reservoir or basin

1. As direct acting
2. Pilot operated and with float traveling between two stops, for upper and lower limit of water elevation.

Electric remote control—solenoid or motor can be furnished



REMOTE CONTROL VALVE

Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

*Packing Replacements for all Ross Valves Through Top of Valve*

**ROSS VALVE MFG. CO., INC., P. O. BOX 593, TROY, N. Y.**

(*Continued from page 32*)

**The Natural Resources Dept.** of the Chamber of Commerce of the United States has proposed a National Water Resource Policy. It is explained as follows by David J. Guy, Asst. Mgr. of the Natural Resources Dept., in the August 7 issue of Business Action, organ of the National Chamber of Commerce issued weekly in Washington:

"Rain and the ocean, rivers and lakes—what do you mean, National Water Policy?" Just so inexpressible and unnecessary does this subject of water appear to many people. It is a far cry from the "old oaken bucket" to faucets, laundry tubs, and bathroom fixtures, but in either case the water supply is taken for granted by the user.

True, there is in this country ample water supply for all needs. The problem is not one of total resources, but of physical control, and legal control. Here also the complexity of the subject is seldom appreciated.

Physical control of water resources is necessary for almost all water users today. The cost of control, delivery and distribution of water is relatively and increasingly high. During the 10-year period 1933–42 federal expenditures for various water uses and controls exceeded all previous outlays beginning with the first appropriation for improvement of rivers and harbors in 1802. State, municipal and private outlays taken together show a similar tendency to increase although not confined to a single period of years as in the case of federal expenditures.

(*Continued on page 42*)

***Proven*** **quality of**

**Design,**

**Material**

**and**

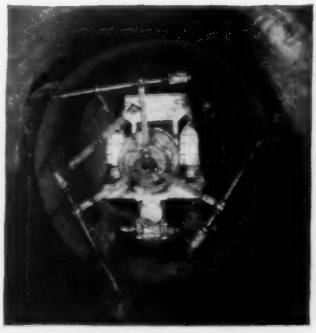
**Workmanship**

***"Ask the man who uses*** **RENSSELAER"**

**RENSSELAER VALVE COMPANY TROY, N. Y.**

# 4500 more feet of Standard Oil pipeline . . . . .

# reconditioned by Centriline!



Not long ago tuberculation and corrosion had a strong hold on Standard Oil's 60" salt water main running from Newark Bay to the plant at Bayway, New Jersey. As a result of this crippled and choked hydraulic efficiency, the plant was not getting the maximum amount of water needed for cooling purposes.

Through the Centriline method of first cleaning the main and then applying by centrifugal force a protective inner lining of 3/16" cement mortar the original carrying capacity of this important pipe line was restored. Not only was there an increase in the amount of water delivered, but also depreciation and pumping costs were cut to a minimum.

Once tests show a decrease in carrying capacity and the budget shows costly pumping expenditures—it's time to Centriline. Wherever your pipeline is situated, whatever its length—if its diameter is 30" or more—our men can quickly reach and recondition it.

We welcome your inquiry.

## CENTRILINE CORPORATION

**142 CEDAR STREET • NEW YORK 6, N. Y.**

*The Centriline process is a rapid and economical method of reconditioning pipe lines. It consists of first cleaning the main and then applying, by centrifugal force, a dense cement mortar lining of required thickness, mechanically troweled to a smooth finish. This is done underground, in place.*

**Restores and Protects Pipe-Line Carrying Capacity**

(*Continued from page 38*)

Water resources are used for the following social and economic purposes: (1) domestic, municipal and industrial water supplies; (2) sewage disposal; (3) irrigation and water supply for farms; (4) transportation by navigable waterways; (5) hydroelectric power; (6) public recreation.

These purposes conflict in many respects. For example, domestic and hydroelectric water must be available the year round, as contrasted with irrigation water, which has a seasonal use. Industries and sewage disposal plants pollute waters, create nuisances, and thus damage domestic water supplies. Public recreation and navigation require constant level lakes and ponds, while other uses require variable-level reservoirs.

Because there is too much water at times, it has become necessary to control floods to prevent loss of life and serious damage to property. Flood control conflicts with most of the beneficial uses, for it requires unobstructed river channels and almost empty reservoirs in order to be most effective.

It is inevitable that a time will arrive, in fact has arrived, when these various water uses come into conflict because the total water supply in a region or river basin is limited. In the settlement of these conflicts, control is divided between the federal government and the states.

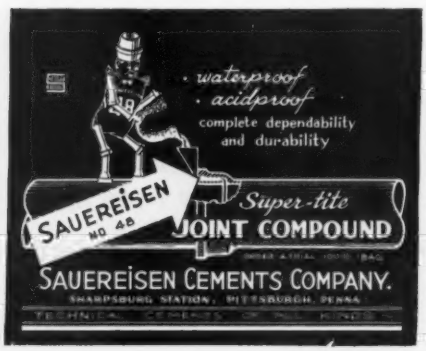
While the federal government has a superior right under its constitutional power to regulate interstate commerce, such regulation is what Congress makes it, and Congress is free to follow a policy of recognizing authorization for water uses deemed necessary by the states.

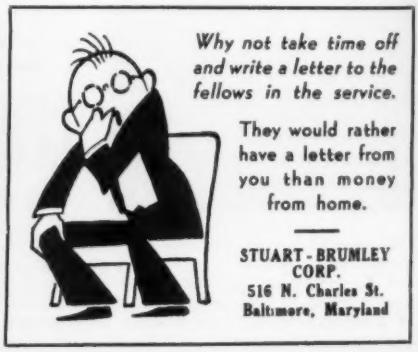
The beneficial use of the ground and surface waters of the United States promises to be one of the most important social, economic and political problems of the postwar period. This fact alone makes it necessary that this country have a sound, economic and well integrated national pattern of development.

Such a pattern is proposed in the declarations on National Water Resource Policies recently adopted by organization members of the National Chamber under its Referendum No. 81.

**A revision of its catalogue, "The A B C of pH Control,"** has been issued by the LaMotte Chemical Products Co., Towson 4, Baltimore, Md., to commemorate its 25th anniversary. The handbook is useful, LaMotte states, to those interested in water analysis, sewage and industrial wastes, boiler feed water, electroplating and other fields requiring specialized controls.

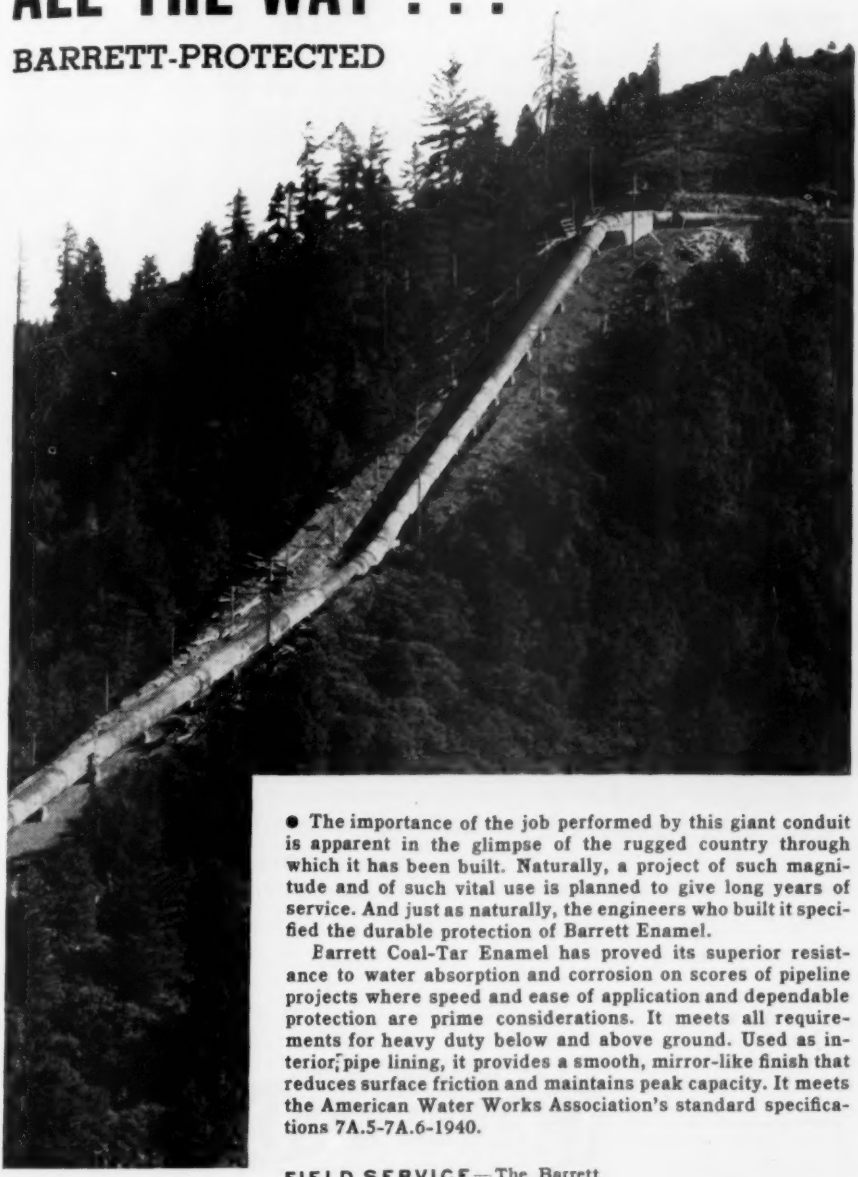
(*Continued on page 42*)





Why not take time off and write a letter to the fellows in the service.
They would rather have a letter from you than money from home.
STUART-BRUMLEY CORP.
516 N. Charles St.
Baltimore, Maryland

# ALL THE WAY . . .

## BARRETT-PROTECTED



96" diameter penstock Pacific Gas and Electric Company, Dutch Flats, California. Barrett Enamel.

● The importance of the job performed by this giant conduit is apparent in the glimpse of the rugged country through which it has been built. Naturally, a project of such magnitude and of such vital use is planned to give long years of service. And just as naturally, the engineers who built it specified the durable protection of Barrett Enamel.

Barrett Coal-Tar Enamel has proved its superior resistance to water absorption and corrosion on scores of pipeline projects where speed and ease of application and dependable protection are prime considerations. It meets all requirements for heavy duty below and above ground. Used as interior pipe lining, it provides a smooth, mirror-like finish that reduces surface friction and maintains peak capacity. It meets the American Water Works Association's standard specifications 7A.5-7A.6-1940.

FIELD SERVICE—The Barrett Waterworks Service Department and staff of Field Service men stand ready to provide a broad measure of cooperation. Services include consultation on technical details, training of crew, and job inspection.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N.Y.

Barrett COAL-TAR ENAMEL

*PREVENT WEAR AND CUTTING of rods, plungers and shafts by using*

MABBS RAWHIDE PACKING

**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**

(*Continued from page 40*)

**Westinghouse Research Laboratories** has announced the development of four new plastics.

"Fosterite" is a tough, moisture-proof plastic which seals radar and radio parts against harmful moisture. Because it is almost as fluid as water in its preformed state, it fills completely every tiny space in electrical windings and coils. A Fosterite-coated transformer, for example, may be submerged in water for weeks or even months and continue to give satisfactory performance, while one coated with ordinary materials would last only a few minutes under such conditions.

"Preformed plastic" is claimed to be a "missing link" in plastics development. Hitherto, plastics have had either moldability or high tensile strength, while this combines the quality of being easily formed into complex shapes with the tensile strength of structural steel. After the war it will be used in many ways to substitute for wood and metals. The plastic is composed of cellulose fibers and a varnish-like resin.

"Micarta 444" can be more easily formed into intricate shapes than was possible in handling laminated plastics, has a tensile strength of 13,000 psi., a compression load of 30,000 lb. and will not soften at temperatures up to 170°F. It is now exclusively used by the aircraft industry.

A new synthetic resin to replace shellac in many important applications simulates the shellac molecule while eliminating the impurities and mica present in the natural product. Westinghouse claims that its product is superior in strength to that of the *Tachardia Lacca*.

(*Continued on page 44*)

ZECO GREENSAND ZEOLITE

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

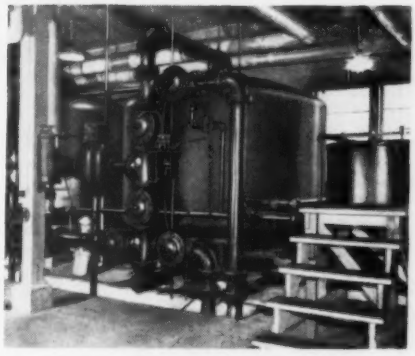
**ZEOLITE CHEMICAL CO.**

**90 WEST STREET** **NEW YORK 62, N. Y.**

# 10 IMPORTANT REASONS for SPECIFYING GRAVER ZEOLITE WATER SOFTENERS

The purchase of a Zeolite Water Softener should be considered carefully as regards initial cost, performance, dependability, and operating economy. When you are ready to make your selection check your requirements against these 10 important advantages of Graver Zeolite Water Softeners:

1. Water of zero hardness (standard soap test) or other predetermined degrees of hardness as desired.
2. Uniform collection and distribution of water, from and to the Zeolite bed, accomplished by means of a reinforced steel plate distributor diaphragm, inset with strainer nozzles on 6″ centers, under the entire bed.
3. Choice of manual, semi-automatic or full automatic operation.
4. Unaffected by flow-rate variations, under the specified limit.
5. Silent, thorough operation with a minimum of attention.
6. Choice of correct Zeolites for most efficient and economical operation.



*Graver fully automatic Zeolite Water Softening Plant.*

7. All welded construction; adequate manholes, reinforced openings for piping; adjustable supporting legs.
8. Comparatively low initial cost and small operating cost.
9. Minimum space requirements.
10. Designed, built, installed, or installation supervised, by Graver to meet your specific needs. Complete service and undivided responsibility.

Graver engineers welcome the opportunity to discuss water conditioning questions with you, and invite your correspondence. There's no obligation.

GRAVER WATER CONDITIONING EQUIPMENT

*Process Equipment Division of*

GRAVER TANK & MFG. CO., INC.

4809-45 Tod Ave., East Chicago, Indiana

NEW YORK CATASAUQUA, PA. CHICAGO TULSA

(*Continued from page 42*)

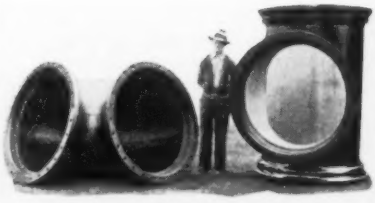
**A multiple industrial fellowship in Mellon Institute,** Pittsburgh, Pa., has been established by the National Council for Stream Improvement (of the Pulp, Paper and Paperboard Industries), Inc., 271 Madison Ave., New York 16, N.Y. The comprehensive research program of this fellowship, which will be conducted by specialists and for which the Institute will provide complete facilities, will pertain to the development of satisfactory methods for the disposal and utilitization of wastes from the manufacture of pulp, paper, and paper board.

According to Dr. E. R. Weidlein, Director of Mellon Institute, "In wartime we have unavoidable increases in the discharge of waste waters to streams. . . . This emergency situation makes especially clear the desirability of reasonable waste treatment and emphasizes the need for more and more pertinent research."

**"The Index to A.S.T.M. Standards,"** covering A.S.T.M. specifications and tests as of December 1943, is available to A.W.W.A. members who request it from the American Society for Testing Materials, 260 South Broad St., Philadelphia 2, Pa.

(*Continued on page 48*)

KUPFERLE
FIRE HYDRANTS
JOHN C. KUPFERLE FOUNDRY CO. - ST. LOUIS



LARGE DIAMETER
PIPE and FITTINGS
including 48-inch

Acipco Cast Iron Pipe and Fittings are available in sizes including 48". Acipco Large Diameter Pipe are made by the Mono-Cast Centrifugal Process.

American
Cast Iron Pipe
Company
Birmingham, Alabama
Sales Offices in Principal Cities

# HYDRO-TITE

## AND DRY BRAIDED FIBREX

**A DEPENDABLE SELF-CAULKING JOINT COMPOUND FOR CAST IRON BELL AND SPIGOT WATER MAINS**

**HYDRO-TITE** is a self-caulking sulphur base jointing compound used to joint bell and spigot cast iron water mains and soil pipe. It comes in powder form which insures uniformity and quick melting.

When poured into a joint, HYDRO-TITE immediately solidifies upon contact with the metal and bonds to both the surfaces of the bell and the spigot for the entire depth of the joint. It requires no caulking and after pouring a joint, water pressure may be immediately applied.

**HYDRO-TITE** is easy to use, no skill being required to make joints that are tight from the start. Joints made with HYDRO-TITE will stand any pressure the pipe will stand.

**DRY BRAIDED FIBREX**

**USED LIKE BRAIDED JUTE**
**WILL NOT BREED BACTERIA**

**A SANITARY** Packing used in jointing bell and spigot pipe for water, sewer mains and soil pipe.

**FIBREX** was designed for use with Hydro-Tite and other self-caulking compounds, but is entirely suitable also for joints made with lead, and for Sani-Tite and other asphalt sewer joint compounds. Thousands of pounds of Fibrex are already in service on water lines throughout the country.

## HYDRAULIC DEVELOPMENT CORPORATION

**Main Sales Office: 50 CHURCH STREET, NEW YORK 7, N. Y.**

**Works: WEST MEDFORD STATION, BOSTON 56, MASS.**

(*Continued from page 44*)

**The War Dept. has granted the Sanitary Corps** authority to commission an additional 211 sanitary engineers in the grades of second lieutenant, first lieutenant and captain, according to a release received on July 28. Qualifications are a degree in civil, sanitary or chemical engineering from a recognized college or university, and; two years experience in sanitary engineering for second lieutenant; four years experience for first lieutenant; and eight years experience for captain (for applicants between 38 and 42 years of age).

Further information can be obtained by writing to the Officer Procurement Service Office, located in each Service Command Headquarters, or to the Officer Procurement Service, War Department, Munitions Building, Washington 25, D.C.

**"Planning Postwar Products and Markets"** is a new pamphlet issued by the Policyholders Service Bureau, Metropolitan Life Insurance Co., New York 10, N.Y. The Bureau's investigation shows that, in the majority of cases, manufacturers are devoting major attention to de-

(*Continued on page 50*)

Expect EXTRA TROUBLE-FREE SERVICE FROM BELL & SPIGOT JOINTS MADE WITH Tegul-MINERALEAD AND YOU WON'T BE DISAPPOINTED

- SULPHUR BASE—faster sealing
- INGOT FORM—cleaner and easier to handle, ship and store
- IMPERVIOUS TO MOISTURE—won't be hurt by rain or flood on the job
- MAKES TIGHT JOINTS with ample flexibility
- SUPER-RESISTANT to mechanical and thermal shock
- OTHER ADVANTAGES TOO . . . Write for more information. Address

THE ATLAS MINERAL PRODUCTS COMPANY OF PENNSYLVANIA
Mertztown • Pennsylvania

Meter Boxes
Meter Testers
Meter Yokes & Couplings
Valve Boxes
Service Boxes
Manhole Covers
Street Castings
Special Castings

H. W. CLARK COMPANY
Mattoon, Illinois, U. S. A.

# IMPORTANT

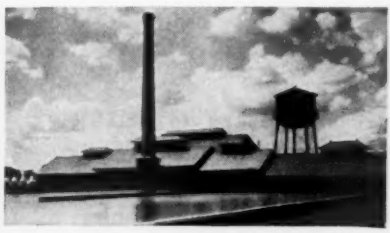
## Public Health must be maintained!

The necessity of maintaining public health in war time is self-evident. Municipal officers in charge of water purification and sewage disposal have a vital responsibility in guarding the nation's health, that should not be underestimated as a contributing factor to final victory.

However, the problems of maintaining public health are *becoming increasingly difficult in the face of material shortages and transportation handicaps.* In order to ease this situation in regard to *Aluminum Sulfate* as much as possible, won't you place your orders as far ahead as you can so that we may schedule our production on an efficient basis.

### Why Most American Cities Prefer General Chemical Aluminum Sulfate

General Chemical Aluminum Sulfate is an especially developed "Alum." High quality and constant uniformity have given it *a time-tested* reputation among water works engineers and sewage plant operators.



★ **FOR WATER WORKS**

1. Makes water crystal clear.
2. Longer filter runs are obtainable.
3. Is economical, used properly will conserve chlorine supplies . . . because it does not require oxidation to make it effective.
4. Superior in tests against other coagulants.
5. High in quality, its constant uniformity can be counted upon.

★ **FOR SEWAGE PLANTS**

1. Clean, easy to handle and economical to use.
2. Simple application, requires only low cost feeding apparatus and minimum attention.
3. Clear, colorless effluents are possible.
4. Precipitated sludge digests readily.
5. Treated digested sludge dries quickly, without odor.

**GENERAL CHEMICAL COMPANY**

**40 RECTOR STREET, NEW YORK 6, N. Y.**

*Technical Service Offices:* Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N.C.) • Chicago • Cleveland • Denver • Detroit • Houston Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh Providence (R.I.) • St. Louis • Utica (N.Y.)

*Pacific Coast Technical Service Offices:*

Los Angeles • San Francisco • Seattle, Wenatchee and Yakima (Wash.)

**In Canada: The Nichols Chemical Co., Ltd. • Montreal • Toronto • Vancouver**

(*Continued from page 48*)

termining which present products have a good immediate potential market, which can be distributed through regular marketing channels, and which can be put into production quickly without large capital expenditures.

**"New Approaches to Surface Protection"** is the title of a pamphlet recently issued by Preferred Utilities Manufacturing Corp. to discuss the advantages ascribed to the company's preparations "White Hot" and "Pyro-Chrome."

These protective coatings take advantage of properties of heat reflectance, a hitherto overlooked principle by which a substantial amount of radiant heat energy is put back to work, instead of being absorbed by heat chamber linings. Refractories, metals, ceramics and glass are substances on which these coatings have already been found effective, and it is hoped by the company that many as yet undiscovered uses will disclose themselves. The company offers full co-operation in testing problematical applications.

The pamphlet may be obtained from Preferred Utilities Manufacturing Corp., 1860 Broadway, New York 23, N. Y.

(*Continued on page 52*)


# SAVE FOR VICTORY

**EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.**

***Now is the time to do your part—SAVE FOR VICTORY***

## National Water Main Cleaning Co.

**30 Church St., New York, N. Y.**

**BRANCHES**

115 Peterboro St., Boston, Mass.
910 William Oliver Bldg., Atlanta, Ga.
7103 Dale Ave., St. Louis, Mo.
576 Wall St., Winnipeg, Man., Canada
3812 Castellar St., Omaha, Neb.
205 West Wacker Drive, Chicago, Ill.
501 Howard St., San Francisco, Calif.
2028 Union Ave., Montreal, Canada
P. O. Box 683, Jacksonville, Fla.

# *Back again!* BRONZE CASES *for* WORTHINGTON-GAMON METERS

*. . . but Present Government Regulations Limit Use to Small Meters*

WAR Production Board Limitation Order L-154 has been amended to permit the allocation of a limited amount of copper to the manufacture of bronze cases for water meters. Bronze will be used for Worthington-Gamon meter cases in ⅝" to 1" sizes only.

**"Watch Dog" Quality Based on Longest Experience, Largest Research Facilities**

The oldest water meter manufacturer, Worthington has constantly improved its broad line, to minimize maintenance, and at the same time measure ever smaller quantities dependably, accurately.

**The Most Extensive Nation-Wide Service**

Another reason why Worthington-Gamon Meters have been specified in the largest U. S. contracts: 24 district offices in 24 leading cities.

★ ★

"Watch Dog" models . . . made in standard capacities from 20 GPM up; frostproof or split case in household sizes. All parts interchangeable with your present meters of our manufacture. Write for Bulletin.

WG4-8

**WORTHINGTON-GAMON METER COMPANY**

282-296 South Street, Newark, New Jersey

*Subsidiary of*

**WORTHINGTON PUMP AND MACHINERY CORPORATION**

The Meter Specified in the Largest Contracts Ever Awarded in the U. S.

WATCH DOG WATER METERS

Power Plant Equipment • Turbines & Turbine-Generator Sets • Condensers, Heaters, Ejectors • Water Purification Equipment • Pumps, Stationary and Portable Compressors • Air-Conditioning & Refrigerating Equipment • Power Transmission Equipment • Construction Machinery, Equipment for Mines • Locomotive Feedwater Heaters • Welding Positioning Equipment • Liquid Meters

(*Continued from page 50*)

**The United States Public Health Service** has completed the publication of its account of four studies in the field of sanitation.

Under the heading "National Inventory of Needs for Sanitation Facilities" four articles have been published in *Public Health Reports* as follows:

I. Public Water Supply * Jan. 7, 1944
II. Milk Pasteurization Facilities Feb. 11, 1944
III. Sewerage and Water Pollution Abatement July 7, 1944
IV. Rural Sanitation July 28, 1944

An epitome of these reports was released by the Office of War Information on Aug. 10, 1944. It is repeated here for the benefit of the readers of the JOURNAL, but with the suggestion that the basis of 200 population as the size above which public water supply and sewage treatment should be built may not be practical for all parts of the country. This question is one that needs study by water works and municipal executives.

* Republished in JOURNAL, March 1944, p. 259.

(*Continued on page 54*)

*The name that speaks Volumes on the Water-front*

PEERLESS PUMP DIVISION, Food Machinery Corp.
301 W. Ave. 26, Los Angeles 31, Calif.
1250 W. Camden Ave., S. W., Canton 6, Ohio
Other Factories: San Jose 5, and Fresno 16, Calif.

M H

HIGH QUALITY VALVES HYDRANTS

M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.

Nature made Asbestos
HERE IS HOW KEASBEY & MATTISON IS MAKING IT SERVE THE WATER WORKS FIELD
For Dependable Service Over the Years . . . Specify K & M "Century" Pipe

Our Ambler plants proudly fly the Army-Navy "E" flag with its star—an honor awarded K&M employees "for continued outstanding production of war materials."

● K&M "Century" Pipe assures you of permanent, trouble-free mains because it is made of asbestos fibre and portland cement . . . two of the most durable elements known to man. Being non-metallic, "Century" Pipe is unaffected by electrolysis, and is immune to the effects of corrosion. There can be no loss in pressure *or* flow, due to tuberculation, when you use "Century" Asbestos-Cement Pipe.

"Century" means real money savings to the community, too, because it costs less to install. Light and easy to handle, "Century" Pipe requires fewer men for installation, even where the larger sizes are involved. An especially important consideration today.

Insure constant good will and satisfaction in your community . . . install K&M "Century" Asbestos-Cement Pipe.

"Century" Pipe is available *NOW* for approved municipal work. Why not inquire about it further at your first opportunity?

**KEASBEY & MATTISON**
**COMPANY • AMBLER • PENNSYLVANIA**

(*Continued from page 52*)

The Sanitary Engineering Division of the U. S. Public Health Service, Federal Security Agency, has reported that deficiencies in water supply, sewage disposal, and other sanitary facilities in many urban and rural areas throughout the United States now menace the health of millions and cause huge economic losses each year.

New sanitation facilities which would cost an estimated total of three and a half billion dollars—but which would largely pay for themselves in savings of health and economic loss—are needed as quickly as supplies of labor and materials and other practical considerations permit their construction, the Public Health Service sanitary engineers reported.

An inventory of public water supply facilities indicated that new and extended public water supply systems costing $803,300,000 are needed to serve adequately the 86,300,000 people who now are served, or could be served, by public water supply facilities in the Nation's communities with a population of 200 or more. This total includes $180,960,000 to construct 4,863 new water supply systems for 4,863 communities, $502,340,000 for extensions and improvements of existing systems in 6,455 communities and $120,000,000 for softening of all water supplies needing such treatment but not now receiving it.

The inventory estimates that the yearly economic loss now resulting from sanitary and other defects in public water supplies totals at least $50,000,000. This includes an estimated $24,000,000 economic loss caused by water of excessive hardness, about $10,000,000 loss due to water-bourne disease, including

(*Continued on page 56*)

Voqt

Fire Hydrants

Standard—"Traffic Model"—Flush Type—Water Crane Type

Voqt

Gate Valves

Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit Any Type Pipe

Also—Floor Stands, Shear Gates—Tapping Sleeves and Valves—Flap Valves—Mud Valves

Voqt

Brothers Manufacturing Co., Inc.
Main at 14th Street, Louisville 3, Ky.

EDSON

DIAPHRAGM PUMPS

*Hand Operated--sizes 2", 2½", 3", 4"*
*Power Operated--sizes 3" and 4"*

*Open Discharge or Force Pump*
*Skid, Truck or Trailer Mounted*

COMPLETE PUMP OUTFITS

*Edson Pumps - Suction Hose*
*Brass Couplings - Bronze Clamps*
*Red Seal Diaphragms*
*Brass Strainer or Foot Valve*
*Hose Spanners - Adapters - Etc.*

*Also*—Brass Hydrant Pumps

THE EDSON CORPORATION

Main Office and Works: 49 D St., South Boston, Mass.

New York, 142 Ashland Pl., Brooklyn

# *By this sign you will know*

INFILCO

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(*Continued from page 54*)

typhoid fever and diarrhea-enteritis, and at least $10,000,000 loss due to miscellaneous other defects in the quality of water supplies.

An inventory of public sewage needs in States indicated that there is need for $2,255,150,000 worth of new or additional sewers and sewage treatment systems for 13,915 out of 16,752 communities in the United States. This includes an estimated cost of about $1,200,000,000 for needed new sewer systems and extensions, and one billion dollars for facilities to treat sewage and industrial wastes.

Public Health Service sanitary engineers estimate that the annual cost of water pollution is more than $100,000,000 a year, and that saving of this amount alone by pollution abatement would, over a period of years, very nearly pay for all the sewage treatment needs of every community of more than 200 inhabitants in the United States.

In another study, an inventory of milk pasteurization needs, it was indicated that 438 milk pasteurization plants which would cost an estimated $8,123,500, are needed in 34 States and Alaska. This inventory indicated that the yearly economic loss attributable to milk-borne disease outbreaks in the United States is at least $3,000,000 and that most milk-borne disease outbreaks are due to raw milk. The inventory showed that more than 97 per cent of the milk supplies of communities in cities of 500,000 population or more is pasteurized, but that less than 25 per cent is pasteurized in communities under 2,500 population.

(*Continued on page 58*)

DIFCO

*Detection of Coli in Water*

This group of Difco Dehydrated Culture Media is recommended for the detection and confirmation of the presence of coliform bacteria in water. Each medium is prepared to conform to all requirements of "Standard Methods of Water Analysis" of the A. P. H. A. and A. W. W. A.

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DIFCO LABORATORIES
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# COMPLETE SELECTION in Socket Fittings!

Sleeve (Solid)
Fig. 521

Plug
Fig. 523

Flanged Socket
Fig. 528

Cap
Fig. 524

⅛ Bend
Fig. 507

¼ Bend
Fig. 501

Reducer
Fig. 526

Every type of socket fitting needed for water works construction and maintenance is included in Grinnell's line.

Special features of Grinnell Socket Fittings:

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| Los Angeles 13, Cal. | St. Paul 2, Minn. |
| Minneapolis 15, Minn. | San Francisco 7, Cal. |

Seattle 1, Wash.

Tee
Fig. 514

Cross
Fig. 516

Split Sleeve
Fig. 522

Tee
Fig. 511

Warren Coupling
Fig. 533

Long ¼ Bend
Fig. 505

# GRINNELL

WHENEVER **PIPING** IS INVOLVED

(*Continued from page 56*)

The latest of the series of studies, an inventory of rural sanitation needs, published in *Public Health Reports,* shows that more than 5,000,000 rural homes now need new or improved water supplies, and that more than 5,000,000 rural homes—including 846,148 entirely without toilet facilities—need sanitary privies as a minimum.

The inventory, based on an analysis of census reports, shows that an estimated 50,000,000 people, or 12,000,000 families, are not now served, and probably could not readily be served, by public water supplies, and that a total of approximately 6,550,000 rural homes are not supplied with running water.

The homes needing new or improved water supplies include 1,530,097 rural homes without a water supply within 50 feet, and an additional estimated 3,763,903 homes with wells, springs, or cisterns within 50 feet, but having sanitary defects, such as improper construction, equipment, or maintenance which permit contamination of the water.

It would cost about $265,000,000 to provide safe water supplies for the 5,294,000 rural homes which need them, *Public Health Service* sanitary engineers estimate.

They also estimate that it would cost about $180,000,000 to provide privies for the homes now without sanitary facilities and to replace half of the 8,505,572 existing outside toilets, about 50 per cent of which are insanitary.

**"The Practical Design of Welded Steel Structures,"** by H. M. Priest is a 150-page book recently published by the American Welding Society. It should serve as a valuable aid to engineers and fabricators engaged in the preparation and execution of welded designs.

Included are discussions of the various welding processes, specifications for electrodes, types of welds, welding positions, qualification tests and inspections. Weld geometry and stress concentration and temperature effects, both physical and metallurgical, are emphasized.

Included are numerous charts to facilitate the design of welded joints and structural members, arranged so as to be applicable for any specified unit working stresses.

The book, in cloth boards, is available from the American Welding Society, 33 West 39th St., New York 18, N.Y., for $1.00 per copy.

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# NEWS OF THE FIELD

**When Samuel B. Morris** succeeded H. A. Van Norman as Gen. Mgr. of the Los Angeles Dept. of Water and Power on October 1, we not only witnessed the passing of the torch of leadership from the hands of one great administrator-engineer to another; but we witnessed the preservation of the fine traditions of service associated with that department.

Water supply, as the oldest of the public services in municipal control, has suffered because it was a part of city government in the days of bad municipal administration. In many cities during the latter years of the past century, the chief of the water department and many of his staff were creatures of the political party in power and while they might be skillful at vote-getting for the boss, they were neither skillful nor responsible water works men.

Such conditions are becoming a part of the "memoirs" of American cities, but even today there is far to go for most of them before water supply administration, as well as employment, becomes a career service.

The West Coast has many things to recommend it, but, to the eyes of this water works man, nothing is more important to the people of those states than the high quality of administration that it has developed for its water works systems.

This is perhaps an instance of the fact that when you don't have plenty of something you prize what you have! In other words, water is so precious and important a commodity on the West Coast and so vital to the development of both city and rural life that the men to whom such service is entrusted are more appreciated than they are elsewhere. And when service is appreciated, its quality improves and the men who engage in it grow in stature and capacity.

Los Angeles has required for its growth high qualities of vision and leadership in the men who headed and those who worked in the water and power system. It has established for the entire personnel the basis for career service—civil service and retirement systems that make the most of the good qualities of both systems and bring out the best in the men and women who work in the department.

Retirement comes to the chief of an organization just as to all the rest of the crew. And when retirement time came to Van Norman, the Board of Water and Power Commissioners picked his successor just as astutely as would the board of any industrial corporation, while at the same time preserving the fine traditions of the department in the characteristics of the

(*Continued on page 2*)

(*Continued from page 1*)

new chief. Samuel Morris is a worthy leader for a great public organization. His appointment will bring good cheer to every man in North America who hopes to develop in his community a higher level of management for municipal services and who hopes that public water supply can become nationally recognized as a career service.

**Samuel B. Morris,** immediate Past Pres., A.W.W.A., was Dean of the Engineering School, Leland Stanford University from 1936 until he resigned last month.

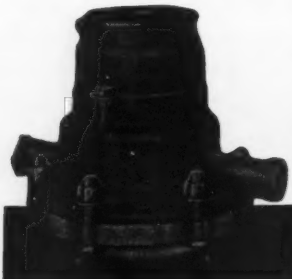
He was born in Los Angeles 54 yr. ago and attended Throop Polytechnic Institute (now California Institute of Technology) and Stanford. In 1912 he joined the Pasadena Municipal Water Dept. and left there as Gen. Mgr. in 1935. Under his supervision, in the years 1932–35, the 328-ft. Morris Dam in San Gabriel Canyon was built for Pasadena. He lives in Palo Alto and is chairman of the Palo Alto Board of Public Works which administers city-owned electric, gas and water utilities, garbage and sewage disposal, airport, yacht harbor and a 200-bed municipal hospital. He is engineering consultant on many national and municipal water and power enterprises. In 1942–43, he was a member of the Bonneville Power Administration and a consultant on system planning and cost allocation of the Grand Coulee Dam.

His activities in the A.W.W.A., which he joined in 1920, have been multitudinous. He has served as Secy.-Treas., Vice-Chairman, and Chairman of the California Section, has been A.W.W.A. Director from California, and has served on a number of committees, in addition to being a Diven medallist.

**H. A. Van Norman** was made head of Los Angeles' consolidated utilities last November 1, when the amalgamation was effected, and accepted the post only for such a period as might be required to secure a successor. He will be retained as Advisory Engr. until January 1, 1945.

(*Continued on page 4*)

**NIAGARA IRON CASE WATER METERS**



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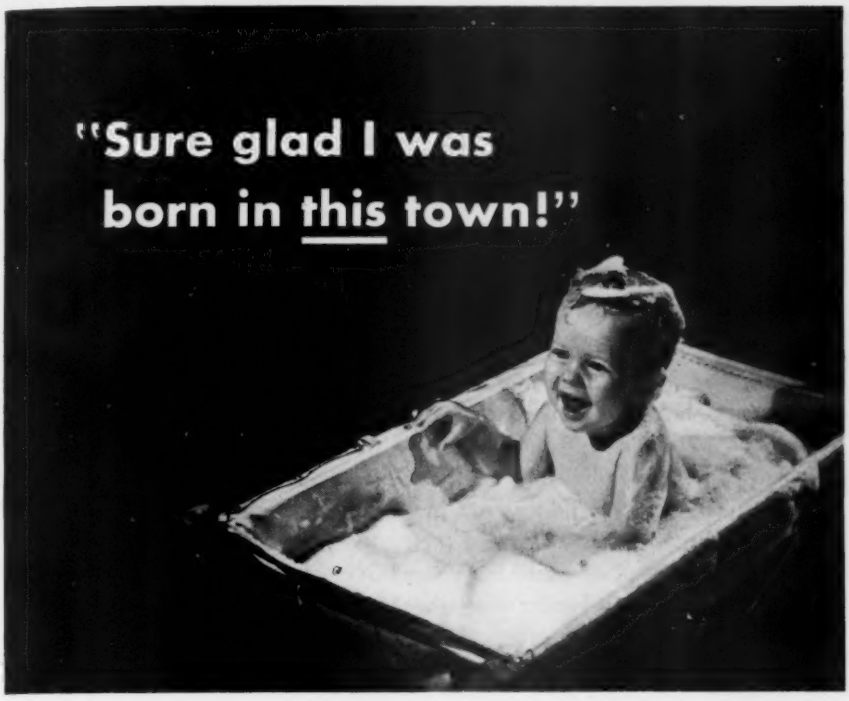


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NEXT to the air they breathe, water is about the most important of your citizen's needs. It's Public Utility Number One—and its quality can decide whether or not your community will be happy and prosperous. Hundreds of modern cities realized this before the war—and installed Permutit* equipment to give them soft, clear water from every faucet in town.

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COOK Deep-Well Turbine Pumps

(*Continued from page 2*)

Van Norman, who was born in Texas 65 years ago, has been a Californian since he was four. He served in the Philippines during the Spanish American War, and engaged in various engineering assignments upon his return. He was Constr. Supt. for the Los Angeles Gas and Electric Corp. in 1907 when he joined the city's water bureau. He supervised the construction of two divisions of the Los Angeles Aqueduct, and when it was completed in 1913 he was put in charge of operation and maintenance. In 1926 he became Asst. Engr. of the water bureau, and in 1929 succeeded William Mulholland as Chief Engr. and Gen. Mgr. of the Bureau of Water Works and Supply. Under him, the Mono Basin project, Bouquet Dam and Reservoir and the interconnection of the municipal water system with the Colorado River Aqueduct were constructed.

Van Norman was a Captain in the Engineers Corps in World War I. He is a Past Director of the A.W.W.A. and Past Chairman of the California Section.

**Samuel M. Ellsworth,** Consulting Engineer, Boston, died at Brattleboro, Vt., on August 13, at the age of 49. He had been ill in a rest home there.

Mr. Ellsworth was a native of Braintree, Mass., and still resided there. He was graduated from the Massachusetts Institute of Technology in the class of 1916, and his first professional appointment was with the Massachusetts Department of Public Health, which he left to serve with the Engineers Corps in the first world war. When he returned to civilian life, he associated himself with several consulting engineers and then established his own offices in Boston.

Mr. Ellsworth was Secretary-Treasurer of the New England Section of the A.W.W.A. at the time of his death. He was a former officer of the New England Water Works Association, had been active in several other engineering societies, and wrote a number of articles on engineering. He served on the Braintree Sewer Board for many years.

(*Continued on page 6*)

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. . . when the boys come home!

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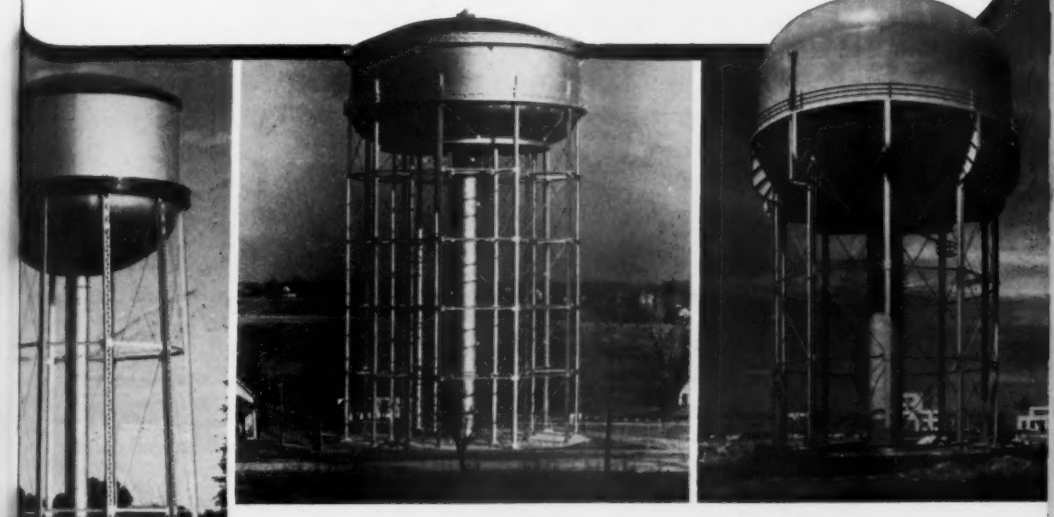

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(*Continued from page 4*)

**Henry E. Elrod,** Construction Engineer of Houston, Tex., died in a hospital there on July 18, at the age of 65. He had recently been engaged on a water improvements project for the city of Houston.

Mr. Elrod was born in Paducah, Ky., educated in Columbus, Tex., and was graduated from Texas A. and M. College. In 1912 he began private practice in Dallas, specializing in sanitary engineering, water works and water supply. He built the "Cisco Dam" while in this office.

He designed and supervised the construction of municipal water supplies at Tyler and Santa Monica, Calif. At Santa Monica, he discovered the inexhaustable underground supply of water for which deep wells were drilled, and which made the town independent of Los Angeles for its water supply. To store Santa Monica's water, he constructed two aboveground reservoirs in independent sections to resist earthquake shocks. They were believed to be the first of their kind.

Mr. Elrod was associated with Robert J. Cummins in the rehabilitation of the La Fruta dam on the Nueces River near Mathis for Corpus Christi.

He also designed a number of sewage disposal works in the West and invented several electro-mechanical devices used in water purification and sewage treatment.

His hobbies of archeology and geology led him to form a notable collection, and he was also a philatelist and numismatist. He joined the A.W.W.A. in February 1916.

**Charles Gilman Hyde,** Prof. of San. Eng., Univ. of Calif., has retired from the position which he had held since 1905 and is now Emeritus Professor. Hyde will continue his wide consulting practice in sanitary engineering on the West Coast. He joined the Association in July 1907 and was elected an Honorary Member in 1939. Many of his articles have appeared in the JOURNAL.

(*Continued on page 8*)

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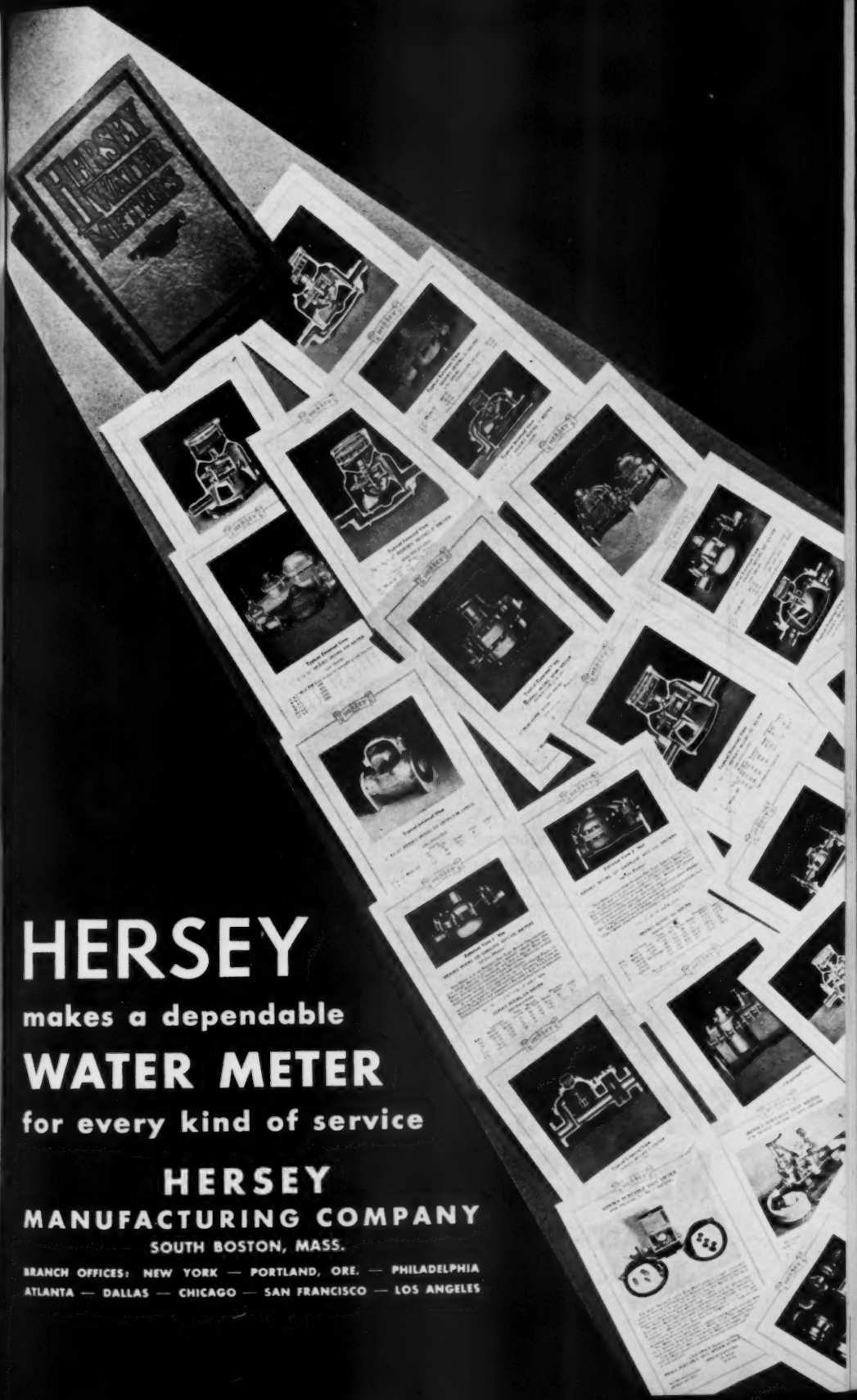
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(*Continued from page 6*)

**Edmund Bruce Ball,** Managing Director of Glenfield and Kennedy, Ltd., pipe and valve manufacturers, Kilmarnock, Scotland, died on June 14 at his home in Monkton, Prestwick, nearby. He was 71 years of age.

Mr. Bruce Ball was born in Thetford, Norfolk, and began his professional training as an apprentice there. He won several scholarships and science prizes during this period and then spent two years at the College of Technology, Manchester. He became chief designer for a manufacturer of mill engines, refrigerators and winding machines, following which he was engaged in various managerial assignments. He went to Italy for three years, and there constructed new works to build engines and automobiles, and effected the amalgamation of a submarine works at Spezia and a marine engine works in Turin. From Italy, Mr. Bruce Ball went to China where he was engineer and commercial agent for a British company in Shanghai, and represented many important British firms in China, Manchuria and Siberia, for water works, mining and railway plants. When he returned to England he became General Manager of D. Napier & Sons, London, and in 1918 he became Managing Director of the Glenfield works. His son, Edmund Bruce Ball, succeeds him in the position.

Mr. Bruce Ball was President of the Institution of Mechanical Engineers in 1939, and in 1943 was elected to Honorary Membership. He joined the A.W.W.A. twenty years ago. In 1939, he was made an Honorary Member of the American Society of Mechanical Engineers, an honor shared by only two other British engineers.

(*Continued on page 10*)

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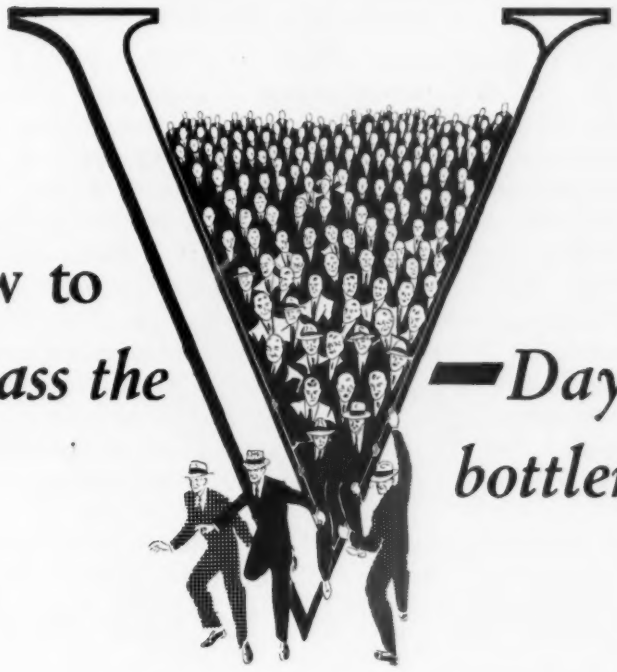
# How to *by-pass the* V-Day *bottleneck*



IT WON'T be long now. In fact, it may have happened before this message is published. But, in any case, remember this . . . when priorities are lifted there's going to be a rush for equipment of all types and there's bound to be a bottleneck.

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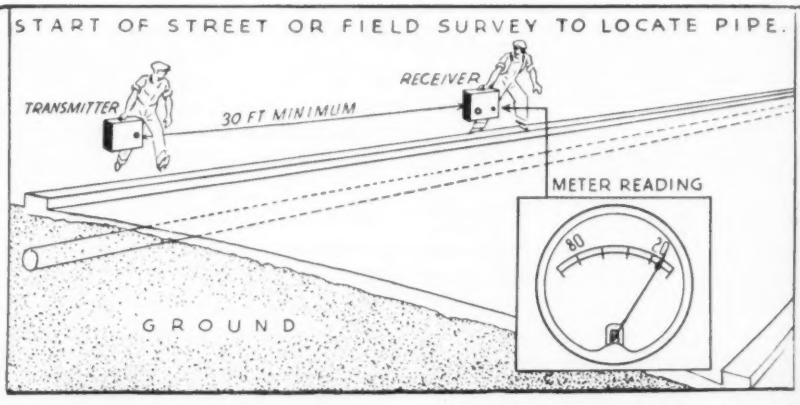
(*Continued from page 8*)

**Frederic T. Mavis** has been appointed Professor and head of the Dept. of Civ. Eng. at Carnegie Institute of Technology, Pittsburgh, Pa. He succeeds Prof. F. M. McCullough, who has retired. Dr. Mavis had held a similar position at The Pennsylvania State College since 1922.

He was graduated from the University of Illinois in 1922. Following a period of professional practice with Kelker, DeLeuw and Co., Cons. Engrs. in Chicago, he was awarded the John R. Freeman Traveling Fellowship of the American Society of Civil Engineers and spent the year 1927–1928 in Europe studying hydraulic engineering. From 1928 to 1939 he was on the staff of the State University of Iowa serving some time as Assoc. Director-in-Charge of the Laboratory of the Iowa Institute of Hydraulic Research and as Professor and head of the Dept. of Mechanics and Hydraulics. He has written and edited numerous papers and monographs in hydraulics, hydrology, and structural engineering.

**W. A. Oeffler,** former Supt. of the Jasonville, Ind., Water Dept., was promoted on August 1 from Senior Operating Engr. to San. Engr. by the Chemical Warfare Service at the Vigo Plant near Terre Haute, Ind.

(*Continued on page 12*)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If you are standardized, and 100% satisfied, we recommend no change. If not, **now** is the time to start standardization on valves you can be **proud** of—**RENSSELAER.** They will **never** let you down.

A factory representative will be glad to call and discuss your valve problems.

---

**RENSSELAER VALVE CO.**

**TROY, NEW YORK**

(*Continued from page 10*)

**Angus MacLachlan,** President of the A. MacLachlan Co., Cleveland, died there on August 6. A native of Canada, Mr. MacLachlan had first lived in this country at Detroit, and moved to Cleveland 30 years ago. His company represented the Simplex Valve and Meter Co., the Chapman Valve Mfg. Co. and the Manistee Iron Works Co.

**Ellwood H. Aldrich,** Cons. Engr., New York, formerly of the partnership of Newsom & Aldrich, has become associated as Planning Engineer with the Water Works Service Co., Inc., recently established as the operating and engineering organization for the water works properties of the American Water Works & Electric Co., Inc.

Aldrich was formerly associated with the Community Water Service Co., now managed by the American Water Works & Electric Co. For the past several years he has actively been engaged in directing extensive water works construction in the Hampton Roads area, Virginia.

(*Continued on page 14*)

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(*Continued from page 12*)

**Elmer T. Howson,** Editor of *Railway Engineering and Maintenance* for the past 28 years, died in Chicago on September 1 at the age of 60. A civil engineer with degrees from the University of Wisconsin, Mr. Howson was engaged in varied railway engineering positions until he joined *Railway Age* as engineering editor in 1911.

Mr. Howson was a brother of A.W.W.A.'s Past President Louis R. Howson.

**Alfred H. Paessler,** formerly Acting Supt. of the Austin Water Filtration Plant, has been commissioned an ensign and is stationed at a Naval Forces school at Harvard University, Cambridge, Mass.

Ensign Paessler succeeded Col. Thomas Green, now overseas in Combat Engineers. Paessler had joined the Austin Water Works in 1939. B. G. Cole, Filter Plant Supervisor of Monroe, La., has succeeded Ensign Paessler.

(*Continued on page 16*)

Here's an up-to-date *AMERICAN* guide on

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ALCO ELECTRIC WELDED STEEL PIPE
You'll want ALCO Electric Welded Steel Pipe because it's strong
—Because it is smooth—assures maximum capacity
—Because its long lengths assure minimum joints, rapid installation
—Because its light weight, too, makes for easier, faster handling
—And because it is widely known, widely used, is thoroughly dependable for vitally important water, gas, oil and sewer lines.
Make your plans now to get the ALCO Electric Welded Steel Pipe you will want. Line up your requirements—and tell us, so that your project will get precedence just as soon as restrictions are lifted.
American Locomotive
ALCO PRODUCTS DIVISION
30 Church Street, New York 8, N. Y.
Dunkirk, N. Y.
Buy War Bonds

(*Continued from page 14*)

**A. M. Rawn,** Chief Engr. and Gen. Mgr., Los Angeles County Sanitation Dist., has been retained as consultant on sewage disposal for Portland, Ore., construction of an interceptor system, which has been voted by the city at a cost of $12,000,000. Rawn is President of the Federation of Sewage Works Associations and spoke at the A.W.W.A. conference in Milwaukee. His papers have appeared in the JOURNAL.

**Maj. Thomas M. Riddick,** San. Engr., U.S. Public Health Service, formerly posted in the Water and Sewerage Dept. of the South Carolina State Board of Health, went overseas in July. Before the war he was a consulting engineer in New York City.

**Gladys Swope,** District Chemist for the North Shore Sanitary District, Waukegan, Ill., is one of the winners in the multiple industrial fellowship established at Mellon Institute, Pittsburgh, Pa., by the National Council for Stream Improvement (of the Pulp Paper and Paperboard Industries), Inc., New York. Miss Swope will be research chemist on the waste disposal project for the pulp and paper industries.

(*Continued on page 18*)

**PUMPED BY PEERLESS —daily**

**300 GALLONS OF WATER for every person in America**

The combined daily capacity of the thousands of Peerless Pumps is in excess of 36,000,000,000 gallons. This, figuratively speaking, is enough water to supply every person in America with 300 gallons per day. The colossal production of water, pumped by Peerless, is distributed among countless fields—wherever a dependable water supply is needed. Engineers and experienced pump users made exhaustive study before selecting these thousands of Peerless Pumps.

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**TURBINE • HI-LIFT • HYDRO-FOIL**

PEERLESS PUMP DIV. *Food Machinery Corp.*
301 W. Ave. 26, Los Angeles 31, Calif.
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**WHAT'S "EATIN" YOUR WATER TANK!**

The answer is rust—the cure is RUSTOP.

Steel tanks rust from the inside out—and fast. Apply RUSTOP the only known sure method of corrosion prevention to all submerged areas.

**INSTALL RUSTOP**
**NO CHEMICALS USED**

Rustop is a cathodic, or electrical method that *removes old rust* on submerged areas and *prevents new rust* from forming.

No longer necessary to sandblast, scrape or paint. Cuts down tank repairs and maintenance—extends its life. Installation without interruption to service. Permanent correction at small cost. Operation only a few cents a month. Guaranteed.

Largest cities and industrial firms use RUSTOP. Act. Save that tank.

Cathodic protection approved by Associated Factory Mutual Laboratories —by War Department (Chief Engineers' Office)—by American Water Works Assn.

**ELECTRO RUST-PROOFING CORP.**
Dayton 10, Ohio, U.S.A.

# 25 Feet in the Air... 25 psi. and Still Bottle-Tight with...

## DRESSER Bellmaster Joints

...uelling tests by Dresser engineers and by users have ...oved the remarkable performance of the new Style 85 ...sser Bellmaster Joints for cast-iron pipe. Above, five ...gths of pipe, joined with Bellmasters, tested tight at ...lbs. air pressure and held tight at 25' elevation.

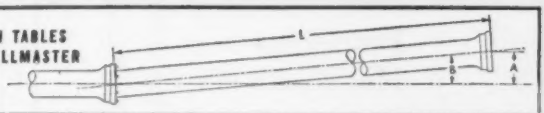
What does this flexibility and tightness mean? Lines ...y be joined and lowered from above ditch—trench ...egularities are taken up by deflection at the joint—...rves may be made with straight lengths of pipe—stresses and strains are absorbed—lines remain tight under virtually any operating conditions.

The Bellmaster is both light and strong. Completely factory-assembled, it is installed in 2 to 5 minutes or less. It fits within the bell, safe from corrosion. Investigate the Dresser Bellmaster... Compare costs. For here is the greatest development made in cast-iron pipe joining in over 100 years.

*Catalog 441A on request.*

*Vibration does not harm this Bellmaster line under tracks.*

**DEFLECTION TABLES**
**DRESSER BELLMASTER**
**STYLE 85**




| Size | Maximum Safe Deflection | | | Permissible Deflection for Joint Assembly | | |
|---|---|---|---|---|---|---|
| | Angle B | Distance A | | Angle B | Distance A | |
| | | L = 16' | L = 18' | | L = 16' | L = 18' |
| 3" | 9° 0' | 30⅛" | 34⅛" | 5° 30' | 18⅛" | 20¼" |
| 4" | 8° 30' | 28⅝" | 32⅛" | 5° 10' | 17⅛" | 19⅛" |
| 6" | 8° 0' | 26⅞" | 30¼" | 5° 0' | 16⅞" | 18⅞" |
| 8" | 7° 0' | 23⅝" | 26⅛" | 5° 0' | 16⅞" | 18⅞" |
| 10" | 6° 30' | 21⅞" | 24⅛" | 4° 30' | 15⅛" | 17" |
| 12" | 6° 0' | 20¼" | 22⅝" | 4° 30' | 15⅛" | 17" |
| 16" | 5° 0' | 16⅞" | 18⅞" | 4° 0' | 13⅜" | 15⅛" |

***Bellmaster ability to realize deflection cuts down installation and maintenance costs.***

**DRESSER MANUFACTURING COMPANY • BRADFORD, PA.**

ONE OF THE DRESSER INDUSTRIES

(*Continued from page 16*)

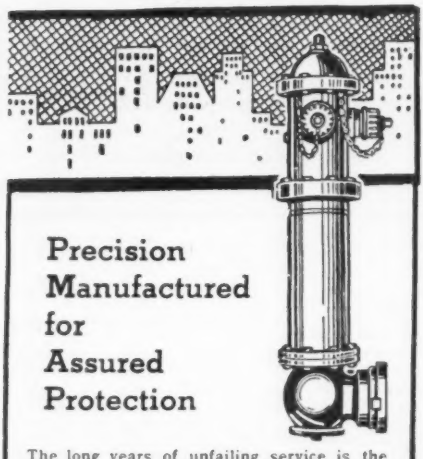
**William L. Lamar,** U.S. Geological Survey, Raleigh, N.C., has recently published Water-Supply Paper 889-E, entitled "Chemical Character of Surface Waters of Georgia."

This 64-page report gives 470 complete analyses of surface waters in Georgia, including analyses of ten-day composites of daily samples collected at ten points on streams for a period of a year and analyses of spot samples collected at 86 other points. The tables of analyses include data on stream flow and suspended matter.

In a brief summary of salinity studies on the Savannah River the relationship between stream flow and noticeable salinity is shown. The daily temperature of the water was measured at nine points on streams in Georgia for a period of a year and these results are shown in tables and graphs.

The text of the report describes the chemical character of the surface waters and the psysiography and climate of the area. The report was prepared in cooperation with the Div. of Mines, Mining and Geology of the Georgia Department of Natural Resources, and may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., for 15 cents.

(*Continued on page 20*)

Precision Manufactured for Assured Protection

The long years of unfailing service is the best proof of the quality of design, materials and workmanship. No. 100 series approved by Underwriters and A.W.W.A.

Send for specifications.

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KUPFERLE FIRE HYDRANTS

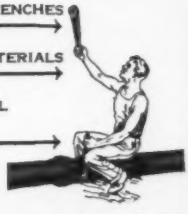
3 *Money, Time and Labor Saving Features of*

UNIVERSAL CAST IRON PIPE

LAID WITH ONLY WRENCHES

NO CAULKING MATERIALS

NO GASKETS. NO BELL HOLES TO DIG.



For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.

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Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.

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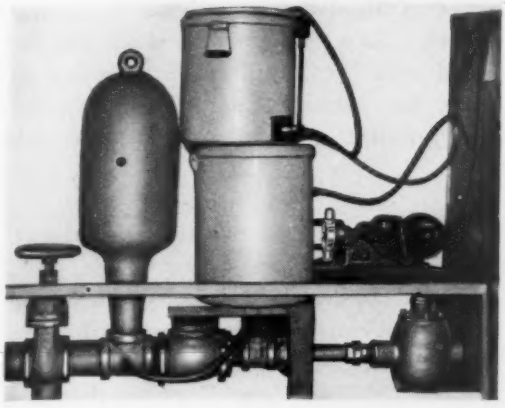
STREET _____

CITY _____

# Bathroom Windows No Longer Open...



## *Thanks to* %PROPORTIONEERS%

In one of our north central states a small town was troubled by hydrogen sulphide odors as well as the questionable quality of one of their soft water well supplies. Frequent flushing of mains was necessary and consumers were forced to open bathroom and laundry windows when drawing large quantities of this water.

On decision of the City Council and Superintendent, a %Proportioneers% Heavy Duty Midget Chlor-O-Feeder was installed as shown. For automatic operation, the Chlor-O-Feeder drive motor is cross-connected to well pump motor starting switch. Two ounces of available chlorine are mixed with each 3 gallons of water in 15 gallon crock, and then after settling, clear solution is drawn off into 20 gallon feed tank. 3 to 4 PPM dosage with Midget Chlor-O-Feeder produces 0.3 PPM residual 1,000 ft. from well. Thanks to %Proportioneers%, water from this well with the addition of hypochlorite is now free from odor and safe for drinking.

Perhaps conditions are not so embarrassing in your town, but if you have a problem requiring chlorination for safety or odor control, write us today. We will gladly make recommendations.

## % PROPORTIONEERS, INC. %

*"Chemical Feeder Headquarters"*

**61 CODDING ST., PROVIDENCE 1, R. I.**

(*Continued from page 18*)

**Harvey F. Ludwig,** Asst. San. Engr. in the Malaria Control Unit of the U.S. Public Health Service, has been assigned by the Public Health Service to the Health Division of the United Nations Relief and Rehabilitation Administration, and is posted in Washington.

Ludwig was formerly with the East Bay Cities Sewage Disposal Survey at Berkeley, Calif., and with the Western Regional Research Laboratory of the U.S. Dept. of Agriculture. As a post-graduate student at the University of California, he worked with Prof. Wilfred F. Langelier on "Graphical Methods of Indicating the Mineral Character of Natural Waters," which appeared in the JOURNAL, and won the A.W.W.A.'s Goodell Prize for 1942.

**H. H. Mace,** who has been serving for the past year as San. Engr. in the Medical Inspector's Office at Sheppard Field, Wichita Falls, Tex., has been made Post Medical Inspector there and advanced in rank from Captain to Major. Before entering the Army, Major Mace was for two and a half years San. Eng. in the U.S. Engineers' Office, Cincinnati, and before that was associated with Alfred LeFeber, Cons. Engr., of that city.

(*Continued on page 38*)

It Pays to use HAYS - It Stays . . .
1869
CORPORATION STOP
(DRIVE PATTERN)
Since 1869 Hays has specialized in the manufacture of water works materials. Then, as now, quality, insuring dependability, was the foremost consideration. Then, as now, ultimate cost was of prime importance.
The annoyance, inconvenience, and expense of replacement can be avoided by using Hays in original installations. Yes, it pays to use Hays. It stays.
Be sure to replace the one you just dug up with another Hays Stop.
Yes, in the old days I too used Hays . . . it pays . . . it stays.
1944
CORPORATION STOPS
YOUR CHOICE FOR
COPPER OR LEAD PIPE
Do More Than Before—Buy EXTRA War Bonds
OUR SEVENTY-FIFTH
HAYS
ANNIVERSARY
COPPER · BRASS · LEAD · IRON
WATER WORKS PRODUCTS
HAYS MANUFACTURING CO., ERIE, PA.

# FULL STREAMS *when the hydrants are* SAFETOPS *because*

- the simple, straightline operating mechanism makes SAFETOPS respond easily . . . instantly . . . in all weathers
- the large standpipe with easy entrance curves and belled nozzles makes SAFETOPS deliver full volume at full line pressure
- the dependable time-proven design and construction makes SAFETOPS thoroughly reliable no matter how seldom they may be operated.

*Write for bulletin which completely describes the many special advantages of the Kennedy SAFETOP Fire Hydrant.*

**THE KENNEDY VALVE MFG. CO. · ELMIRA, N. Y.**

**KENNEDY *Safetop* HYDRANT**

(*Continued from page 20*)

**Earnest Boyce,** Chief Engr. and Director, Div. of Sanitation, Kansas State Board of Health, has resigned in order to accept appointments as Professor of Municipal and San. Eng. at the College of Engineering, University of Michigan, and as Professor of Public Health in the School of Public Health at the same university. He succeeds in the former post Prof. W. C. Hoag, who has reached retirement age.

Boyce has been on leave-of-absence from the Kansas State Board of Health since 1941. In the interim he has been water supply consultant to the Quartermaster General and subsequently Senior San. Engr. for the U.S. Public Health Service.

Boyce is a civil engineering graduate of Iowa State College and a Master of Science in Civil Engineering from Harvard University. He served as an officer in Coast Artillery overseas in the first world war and went to the University of Kansas as Asst. Engr. for the State Board of Health in 1920. In 1924 he was appointed Chief Engr. and Director of Sanitation.

**Lt. Curtis R. Buttenheim,** son of Edgar J. Buttenheim, Pres. of *The American City,* was recently commended by Brig. Gen. G. X. Cheeves

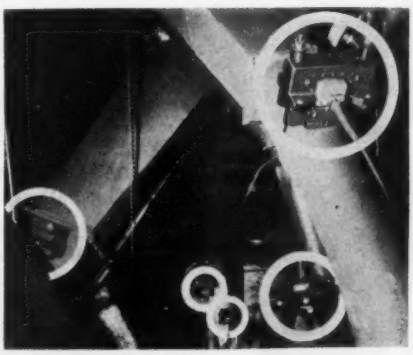
(*Continued on page 42*)

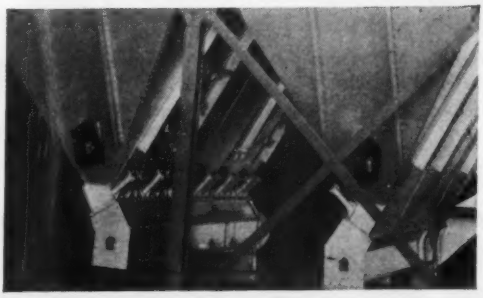
SYNTRON

"Pulsating Magnet"

ELECTRIC VIBRATORS

with Rheostat Controlled Adjustable Power





for Clogged Bins, Hoppers and Chutes

Literature on request

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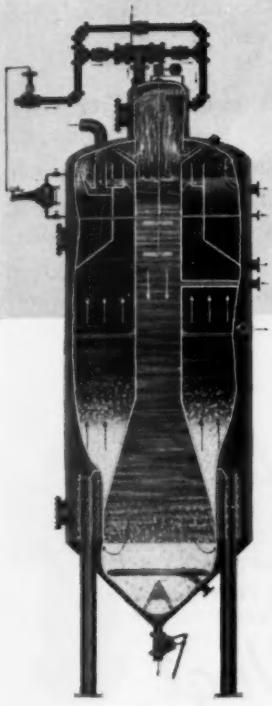
428 Lexington
Homer City, Pa.

# $H_2O$ . . . and what else ?



*Cross-section view of a Graver Hot Process Water Softener with Deaerating Equipment.*

RAW WATER is seldom fit for boiler feed use. And it's the extra ingredients that cause the trouble . . . calcium and magnesium bicarbonates, for instance. When heated, these compounds become insoluble . . . form scale on the boiler tubes . . . reduce heat transfer efficiency . . . and even cause localized overheating.

Graver Hot Process Water Softeners effectively remove these impurities in the raw water supply . . . improve boiler efficiency . . . eliminate frequent shutdowns for tube cleaning . . . and materially reduce the cost of maintenance and repair. It's a job they're doing in hundreds of plants all over the country . . . efficiently and economically.

Whatever your water conditioning problem may be, you'll find it worthwhile to consult with a Graver engineer. He'll submit unbiased recommendations and estimates without obligation.

*Process Equipment Division*
*of*
**GRAVER TANK & MFG. CO., INC.**
**Tod Ave., East Chicago, Ind.**
NEW YORK CATASAUQUA, PA. CHICAGO TULSA

**GRAVER**
**WATER CONDITIONING EQUIPMENT**

*Hot Process Water Softeners—Zeolite Water Softeners—Water Filters—Oil Removal Filters—Taste and Odor Removal Filters—Reactivators—Chemical Proportioning Equipment—Filtering Material.*

(*Continued from page 38*)

at his base in India for the speed and dispatch with which his truck battalion fulfilled its function of clearing dock areas. The port in which Lieutenant Buttenheim is based has broken records in world shipping.

**Roy E. Dodson Jr.** has been appointed San. Engr. in the Div. of Water Development, San Diego, Calif. He was for 4½ years Assoc. State San. Engr. in the Oregon State Health Dept., and had previously been San. Engr. for Contra Costa Health Dept., Martinez, Calif. For a year he was with the Water Purification Div. of the San Francisco Water Dept. He is a graduate of the Univ. of California.

**W. D. Hurst,** former Engr. of Water Works and Asst. City Engr. of Winnipeg, Man., has been appointed City Engr.

Only 36 years of age, Hurst is one of the youngest city engineers in Canada. He is a native of Winnipeg and graduated in civil engineering from the University of Manitoba in 1930. He won a teaching fellowship from Virginia Polytechnic Institute, Blacksburg, Va., where he served during the following year. In 1931, he returned to his home town where

(*Continued on page 44*)

EDSON
DIAPHRAGM PUMPS
*Hand Operated--sizes 2", 2½", 3", 4"*
*Power Operated--sizes 3" and 4"*
*Open Discharge or Force Pump*
*Skid, Truck or Trailer Mounted*
COMPLETE PUMP OUTFITS
*Edson Pumps - Suction Hose*
*Brass Couplings - Bronze Clamps*
*Red Seal Diaphragms*
*Brass Strainer or Foot Valve*
*Hose Spanners - Adapters - Etc.*
*Also*—Brass Hydrant Pumps
THE EDSON CORPORATION
Main Office and Works: 49 D St., South Boston, Mass.
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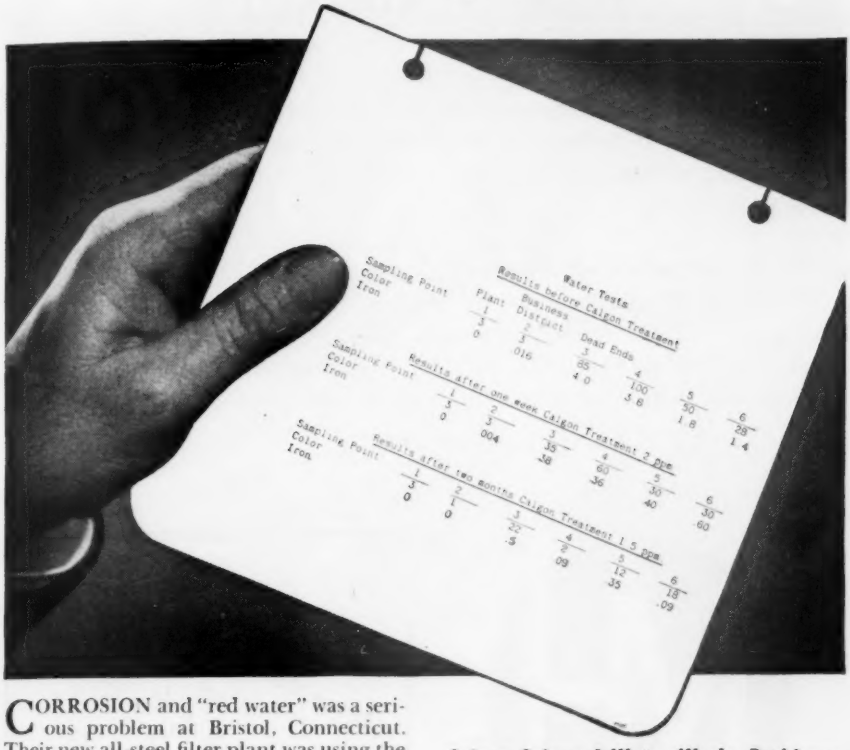
Vogt
*Fire Hydrants*
Standard—"Traffic Model"—Flush Type—Water Crane Type

Vogt

*Gate Valves*
Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit Any Type Pipe
*Also*—Floor Stands, Shear Gates—Tapping Sleeves and Valves—Flap Valves—Mud Valves
Vogt
Brothers Manufacturing Co., Inc.
Main at 14th Street, Louisville 3, Ky.

# Calgon *controls corrosion* at Bristol, Conn.




CORROSION and "red water" was a serious problem at Bristol, Connecticut. Their new all-steel filter plant was using the usual methods of water purification; namely aeration, alum and soda ash treatment, followed by mixing, coagulation and infiltration. Raw water was soft, low in alkalinity and mineral matter. Post lime treatment was used to control "red water."

Despite the use of lime, difficulty with corrosion was experienced as evidenced by the data in chart, in which sampling points 3, 4, 5 and 6 represent "dead ends" of the distribution system. The addition of Calgon was begun. Results were quick and striking. For "before and after" comparison, see chart above. Note that after one week of Calgon* treatment both color and iron had taken a decided drop at most of the sampling points.

Equally good results have been obtained in hundreds of other cities. Write for facts.

## Calgon Solves 4 Water Works Problems

1. **Prevention of scale** from hard, high-bicarbonate waters. Calgon, added at the plant, prevents scale formation in mains, meters and hot-water heaters, throughout the system.

2. **Corrosion control** — Calgon forms a thin protective film on metals and metal oxides at pH values of 5.0 and higher. This reduces the attack of oxygen to such an extent that corrosion ceases to be a problem.

3. **Prevention of "red water"** — Calgon prevents the precipitation of dissolved iron. Thus "red water," either from iron initially present in well water, or from corrosion, can be eliminated.

4. **Stabilization of water** following lime or lime-soda softening. Calgon's ability to prevent precipitation of calcium carbonate stabilizes water to the ends of the system.

**Calgon is the registered trade-mark of Calgon, Inc., for its glassy sodium phosphate products.*

HAGAN HALL HUDOMIN CALGON

calgon, inc.

A SUBSIDIARY OF HAGAN CORPORATION

HAGAN BUILDING PITTSBURGH 30, PA.

(*Continued from page 42*)

he was employed in the city engineering office until he became Engr. of Water Works in 1934.

A paper by him appeared in the JOURNAL in 1942.

**The Sauereisen Cements Co.,** manufacturers of sulfur-base melting-type pipe joint compound, and acid-proof cement, is now occupying a new and greatly enlarged plant located at 1045 North Canal St., Pittsburgh, 15, Pa.

This is the fourth expansion move made by the firm since it was established in 1899. In addition to joint compound, over 30 different technical cements and compounds are manufactured, including "Insa-lute" (liquid porcelain).

**Administrative offices** of the Pomona Pump Div. of the Joshua Hendy Iron Works have moved from Pomona to the Hendy plant at Sunnyvale, Calif. Sales, advertising and export transactions will be carried on in a consolidated office. Manufacturing will continue at Pomona and at the Torrance, Calif., plant of the Pomona Pump Division.

(*Continued on page 46*)

M H

HIGH QUALITY
VALVES
HYDRANTS

M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.

Meter Boxes
Meter Testers
Meter Yokes & Couplings

Valve Boxes
Service Boxes
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Street Castings
Special Castings

H. W. CLARK COMPANY
Mattoon, Illinois, U. S. A.

# WHAT SOFT WATER MEANS TO YOUR CITY

SOFT, iron-free water, clear and sparkling, from every faucet in every home means cleaner washes, easier household cleaning, more luxurious bathing, and remarkable savings on soap and plumbing repairs. Your industrial plants, too, will appreciate soft, iron-free water, for hard water interferes with many industrial operations. Refinite offers a complete line of water conditioning equipment. Whatever your water problem may be, Refinite will gladly discuss it with you . . . make recommendations, and furnish quotations without obligation.

**The Refinite Corporation**

Write for Free Catalog—108 Refinite Bldg., Omaha 8, Nebr.

(*Continued from page 44*)

**A strike for better water** was called by housewives in the town of Hooversville, Pa., according to a United Press release of August 9. The women, wives of miners employed by the Wilbur Coal Co., barred the entrance to the mine, and voted to refuse to pack lunches or wake their husbands for work until the company agreed to make further efforts to secure a water well free of sulphur. The women claimed that the water supply was "unfit to drink or bathe in."

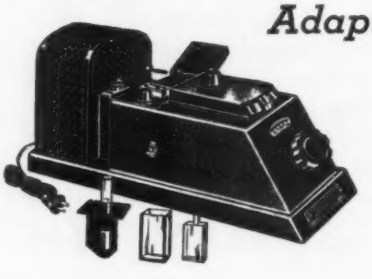
**The Fifth Annual Conference** of the Engineers' Society of Western Pennsylvania will be held in Pittsburgh at the William Penn Hotel, on Monday and Tuesday, October 30 and 31, 1944. A full program will crowd sessions from 9 to 6 each day.

**Hays Mfg. Co.** has appointed George A. Cunningham of Birmingham, Ala., as its representative in Alabama, Georgia, Tennessee, Mississippi and Louisiana. He was Assistant Secretary and Treasurer of the Alabama Water Service Co. for the past 16 years. Herman Peterson, formerly representing Hays in Louisiana and Western Tennessee, will now cover Texas, Oklahoma and Arkansas. Lester L. Buzzard, who

(*Continued on page 48*)

KLETT SUMMERSON
ELECTRIC PHOTOMETER

*Adaptable for Use in Water Analysis*



**Can be used for any determination in which color or turbidity can be developed in proportion to substance to be determined**

KLETT MANUFACTURING CO.
179 EAST 87th STREET · NEW YORK, N. Y.

# GOOD-TASTING WATER

## Insures Public Satisfaction

**Waterworks men who use Hydrodarco never have to worry about the taste of water. Hydrodarco—the activated carbon, made especially to remove odors and unpleasant tastes from water—adsorbs foreign elements to insure a high degree of palatability at satisfactory cost.**

DARCO
CORPORATION
60 East 42nd Street, New York 17, N. Y.

HYDRODARCO

*Distributing Points:*

New York, Buffalo, Cincinnati, Chicago, St. Louis, Kansas City,
San Francisco, Los Angeles, Marshall, Texas

## Wanted—March 1944 JOURNALS

**The Association's stock of JOURNALS for March 1944 is exhausted. If your copy is in good condition and you are willing to part with it, drop a postal card to Association headquarters. Fifty cents will be paid for each copy bought.**

**AMERICAN WATER WORKS ASSOCIATION**
**500 Fifth Avenue, New York 18, N. Y.**


*(Continued from page 46)*

formerly handled Eastern Tennessee, Georgia, Alabama and Mississippi, has been made Sales Manager of the company.

**The Universal Calculator,** a slide rule device for computing flow of water in pipes by the Hazen-Williams formula, has been designed by T. Francis O'Connor and is being distributed by the Grinnell Co., Inc., Providence, R.I., gratis.

The Calculator gives readings for length of pipe, size of pipe, coefficient of pipe, flow in gpm., velocity in pipe, total pressure loss in pounds for given pipe length, and total pressure loss in feet for given pipe length.

**"Only a Gasket,"** a Kodachrome film, running 35 min., with or without sound effects, is available gratis from Hathen Productions, 264 South Van Pelt St., Philadelphia 3, Pa. Lowell Thomas reads the narrative which accompanies the sound film. The picture describes gasket uses and requirements, and shows continuous engineering research and other operations in the Goetze Gasket and Packing Co., Inc., New Brunswick, N.J. It might be of interest for display at company meetings.

*(Continued on page 50)*


ZECO GREENSAND ZEOLITE

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

**ZEOLITE CHEMICAL CO.**
**90 WEST STREET** **NEW YORK 62, N. Y.**

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# Cast Iron Pipe

*Manufactured in Sizes 2" to 96"—*
*A large stock constantly on hand,*
*facilitating prompt shipment.*

**Bell and Spigot Pipe** **Special Castings**

**Flanged Pipe** **Flexible Joint Pipe**

**Short Body B. & S. Specials**

**Warren Spun Centrifugally Cast Iron Pipe**

## Warren Foundry & Pipe Corp.

*and*

**Warren Pipe Co. of Massachusetts, Inc.**

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*Works*
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PALMER
Filter Bed
AGITATORS
Prevent Sand Beds From Cracking
Eliminate Mud Balls
Save Wash Water
Lengthen Filter Runs
Higher Rates of Filtration
ACTIVATED ALUM • BLACKALUM • PALMER FILTER BED AGITATORS
STUART-BRUMLEY CORP., 516 N. Charles Street, Baltimore - 1, Md.

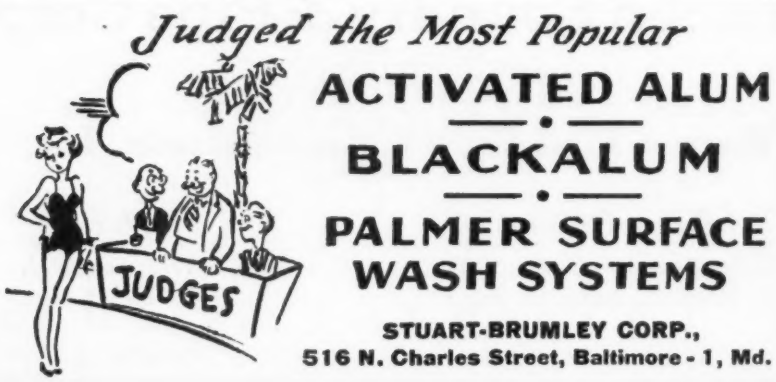
(*Continued from page 48*)

**Leon H. Marsh** has been elected Vice President and Sales Manager of the Kennedy Valve Mfg. Co., of Elmira, N.Y. Marsh has been associated with the company for more than 25 years. After having been Assistant Sales Manager for many years, he was made Acting Sales Manager in 1941, upon the death of Clarence H. Kennedy, who had been the Company's Vice President and Sales Manager; and was promoted to the position of Sales Manager in 1942.

Mr. Marsh will be in charge of all sales and public relations of the company, which manufactures iron-body and bronze valves; malleable iron, bronze, and cast-iron pipe fittings; fire hydrants; and various valve specialties.

**Apparatus for the determination** of the relative porosities of materials has been patented by Stuart H. Hahn and Robert H. Judson, and assigned to the Goodrich Rubber Co.

The device determines the relative porosities of various materials by drawing air or gasses through the material and indicating the relative rate of flow. It was originally designed for testing sponge rubber, but it has many other applications, the company believes.



# NEWS OF THE FIELD

**Engineering and technology** has served this country mightily during the war emergency. Inventive genius and industrial leadership have made the United States the world's greatest arsenal. Some observers of affairs suggest that engineering and technological advances brought the world into this second great war of the century.

Fortunately the leaders of the engineering societies feel that engineering and technology have a place in planning for the peace—and have definitely recorded this opinion.

Malcolm Pirnie, Pres. of the American Society of Civil Engineers and long term worker in and Past-Pres. of the American Water Works Association, has led the presidents of the American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, American Institute of Electrical Engineers and American Institute of Chemical Engineers in giving public utterance to a series of suggestions concerning postwar Germany that merit the careful consideration of every American.

The program worked out by the five scientific leaders for industrial control of postwar Germany is designed to hobble permanently the war-making potentiality of the Reich without destroying facilities necessary to support its peacetime economy.

The theme of the technicians' program throughout is neither for a "hard" peace such as the total destruction of German industries, as was projected in the recent Cabinet-splitting proposal of Henry Morgenthau Jr., Secretary of the Treasury, nor a "soft" peace such as is advocated in other quarters.

The jointly proposed program recommends that the following steps be taken against the four industries "which are the most essential for war purposes and the least essential for a peacetime economy."

"Eliminate all synthetic oil capacity and prohibit reconstruction of plants and importation of oil beyond normal peacetime inventories.

"Eliminate 75 per cent of Germany's synthetic nitrogen plant capacity and prohibit reconstruction of plants and all importation of nitrogen compounds.

"Eliminate 50 per cent of Germany's steel-making capacity in those categories of plants which are most capable of producing essential war

(*Continued on page 2*)

(*Continued from page 1*)

materials, such as heavy forging and high alloy steels. Control imports of manganese, chromium, nickel and tungsten, which are practically non-existent in Germany. Also prohibit importation of iron ore, flux material, steel and steel products beyond normal peacetime inventories.

"Eliminate aircraft plants and equipment including alumina and aluminum plants and prohibit importation of aluminum ingots beyond pre-war peacetime needs."

This statement has been brought to the attention of Secretary-of-State Hull and is made a matter for realistic consideration by the suggestion that the peace table needs some engineers around it, if it is to be expected to produce real peace.

Three cheers for these engineering leaders who have so forcefully stated that engineering and science can help just as practically in the making of peace as in the making of war and war materials!

**Thomas Smithson,** Cons. San. Engr. of Portland, Ore., who has been First Lieutenant in the Sanitary Corps since February 1943, is now serving as Hospital Construction and Maintenance Liaison Officer in a base surgeons' office in New Guinea.

He writes from there: "It is interesting work in that I have a chance to use a little of my engineering experience. Water supply and sanitation problems also fall to my lot. Of course our water problems here resolve themselves into the matter of maintaining a supply of sorts and to the continuous checking of the chlorination procedures. Due to the impossibility of serving the entire Base with one controlled or even a small number of controlled water systems it is necessary to have the chlorination of water done by each individual unit which requires a constant instruction and checking program to insure safety.

"Sewage disposal is a matter of proper operation of pit latrines. Several of the larger hospitals have a sewer system of sorts (tin pipe) with septic tanks for treatment, but the Base has none of these modern conveniences.

"I have been pleasantly surprised at the climate here. Except for the even temperature of approximately 85 and the tropical type of vegetation I could well think that I was back home in Oregon. The resemblance lies in the fact that it rains a lot here also and that a luxurious green growth covers all the land. There are a large number of coconut palms in the area here and the main danger surrounding us now is that connected with falling coconuts. It is really quite a hazard at times and several fellows have been hit. Seems funny to be in a war zone and have the main hazard something of that sort."

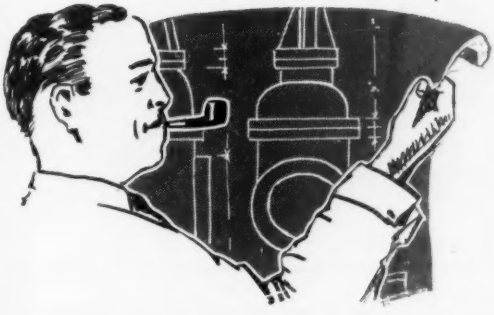
(*Continued on page 4*)

*When you consider*

# VALVES and HYDRANTS

*for that*

**Post War Project**



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# RENSSELAER!

**and be assured of the best in Design, Workmanship and Material**

*"Ask the man who uses RENSSELAER"*

**RENSSELAER VALVE CO., TROY, N. Y.**

(*Continued from page 2*)

**Winfred D. Gerber** retired on October 1 as engineer for the Illinois State Water Survey. He was engaged in studies of the hydraulic phases and made investigations of the occurrences, amounts and availability of ground water. The survey laboratory is located on the Univ. of Illinois campus, Urbana, Ill.

Gerber is a graduate of the Univ. of Illinois, having received a B.S. degree in municipal and sanitary engineering in 1889 and later a professional civil engineering degree. He was a consulting engineer on railways and other organizations until he joined the Water Survey staff in October, 1928. Immediately previous to that date he was President of the Village Board of Glencoe, Ill., a job comparable to that of a mayor. He resigned from this position in order to move to Urbana. Gerber was a winner of the Fuller Award for 1944.

**Lt.Col. C. A. Flannery,** former Sales Mgr. of the Industrial Engineering Co., Wilmington, Calif., is now on duty with the Army Emergency Relief in Washington, D.C. He has previously served at Ft. Lewis, Wash., and in the Hq. of the Fourth Army at Ft. Sam Houston, Tex.

(*Continued on page 6*)


# SAVE FOR VICTORY

**EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.**

***Now is the time to do your part—SAVE FOR VICTORY***

## National Water Main Cleaning Co.

**30 Church St., New York, N. Y.**

**BRANCHES**

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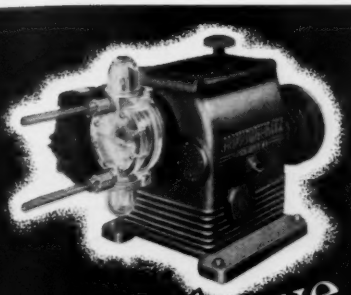
**7103 Dale Ave., St. Louis, Mo.**
**576 Wall St., Winnipeg, Man., Canada**
**3812 Castellar St., Omaha, Neb.**
**205 West Wacker Drive, Chicago, Ill.**
**501 Howard St., San Francisco, Calif.**
**2028 Union Ave., Montreal, Canada**
**P. O. Box 683, Jacksonville, Fla.**



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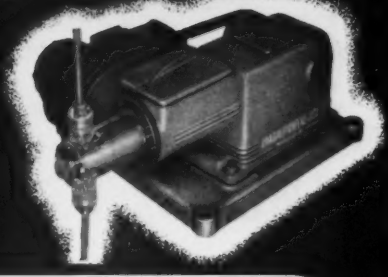
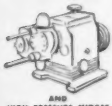
HEAVY DUTY CHEM-O-FEEDER

if you have a pumped water supply



°₀PROPORTIONEERS°₀
HIGH PRESSURE MIDGET CHEM-O-FEEDER

HEAVY DUTY CHEM-O-FEEDER



AND HIGH PRESSURE MIDGET CHEM-O-FEEDER

ARE PRODUCTS OF LONG EXPERIENCE

ECONOMICALLY PRICED

°₀Proportioneers°₀ Chemical Feeders and Hypochlorinators treat pumped water supplies automatically with no more attention than refilling chemical reagent tank periodically.

For injecting chemical solutions into low or negative pressures, such as a pump suction, and positive pressures up to 100 pounds per square inch, such as pump discharge, we offer diaphragm type Chlor-O-Feeder and Chem-O-Feeder proportioning pumps. These feeders have no packing glands and are equipped with "See-Thru" plastic pump heads so that diaphragm and check valves can be observed while in actual operation.

For injecting chemical solution into positive pressures over 85 pounds per square inch up to 200 pounds per square inch, we offer plunger type Chlor-O-Feeders and Chem-O-Feeders with special "Fluid Sealed Yokes", which prevent air from reaching the packing gland, and hence prevent air binding, build-up on plunger, cutting of packing and subsequent packing failure.

°₀Proportioneers°₀ Chlor-O-Feeders and Chem-O-Feeders, both diaphragm and plunger type, are backed by our years of experience gained from thousands of installations of these same Chlor-O-Feeders and Chem-O-Feeders in this country and abroad.

We will gladly furnish our recommendation and quotation on a suitable feeder for addition of calcium or sodium hypochlorite, alum, soda ash, lime slurry, Calgon, ferric chloride or any other chemical solution.

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"Chemical Feeder Headquarters"

WRITE TO %PROPORTIONEERS, INC.%, 61 CODDING STREET, PROVIDENCE 1, RHODE ISLAND

(*Continued from page 4*)

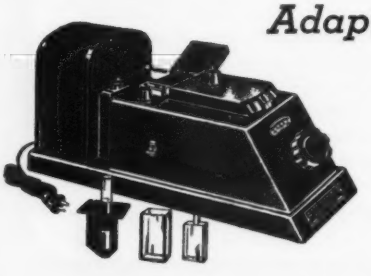
**Neil F. Kershaw,** former Chief Chemist, Indianapolis Water Co., is now serving with the 5th Service Command Hq., Columbus, Ohio. He transferred there from the office of the Post Engr., Berry Field, Tenn. When he left Indianapolis in 1942 he first joined the Constructing Quartermaster of the 4th Corps Area, Atlanta, Ga., as San. Engr.

**William E. Stanley,** formerly Prof. of San. Eng., Cornell University, has been appointed professor in charge of sanitary engineering courses in the Dept. of Civ. and San. Eng. at Massachusetts Institute of Technology. Stanley recently returned from North Africa where he served as Major in the Corps of Engineers and had assignments as Water Supply Officer for seven months during the North African invasion and the Tunisian campaign and Chief of Construction in the Service of Supply for eight months.

The appointment of Stanley is part of a plan to expand the M.I.T. program in sanitary engineering to meet the anticipated postwar demand for sanitary engineers needed in the development of public health facilities, the abatement of stream pollution, the operation of water and sewage treat-

(*Continued on page 8*)

**KLETT SUMMERSON**
**ELECTRIC PHOTOMETER**



***Adaptable for Use in Water Analysis***

**Can be used for any determination in which color or turbidity can be developed in proportion to substance to be determined**

**KLETT MANUFACTURING CO.**
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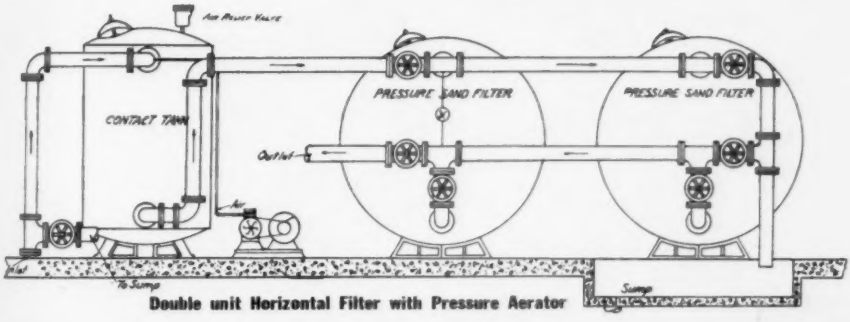
*For the Removal of IRON from Water*

**Refinite**

**Pressure AERATION and FILTRATION**

**In the Pressure Aeration and Filtration method, raw water is forced first into the pressure Aerator where it is thoroughly oxidized, and the iron precipitated. It then passes through a bed of contact ore in the Aerator which removes a large portion of the iron. Finally, the water goes into the Pressure Sand Filter where all remaining traces of iron are filtered out. The water produced by this method is clear, sparkling, and free of all iron and sediment. It is used extensively by municipal and industrial plants.**

**Iron is extremely objectionable in water supplies because it forms stains; forms deposits which clog pipes and machinery; imparts a metallic taste. The Refinite Corporation offers several types of iron removal equipment depending upon the nature of the water and the results desired. Write Refinite today for quotations and recommendations. There is no obligation.**




**Double unit Horizontal Filter with Pressure Aerator**

**The Refinite Corporation**

**102 Refinite Bldg., Omaha, Nebr.**

(*Continued from page 6*)

ment plants and the treatment of industrial wastes. Stanley, in addition to being active for 20 years as a consulting sanitary engineer and five years as a teacher of sanitary and public health engineering at Cornell, was recently Chief of Sewerage and Incineration in the Construction Div. of the War Dept.

Stanley is a native of Kansas and took his undergraduate work at Kansas State College, receiving a B.S. degree in civil engineering in 1912. He did graduate work at Purdue, where he specialized in hydraulic engineering and received the degree of Civ. Engr. in 1916. While at Purdue, Stanley carried on experimental research on sewage spray nozzles, piping, valves and fittings.

Stanley taught hydraulics and hydraulic laboratory at Purdue from 1913 to 1917 and left to enter the First Officers Training Camp of World War I. He was First Lieutenant and Captain in the Corps of Engineers, serving two years in France with Combat Engineers and as an instructor in the Second Corps Engineering School.

After the war Stanley attended the University of Toulouse in southern France, studying French language and hydraulics.

(*Continued on page 10*)

WATER REFINING
EQUIPMENT HEADQUARTERS
INDUSTRIAL—PROCESS
RAILROAD—MUNICIPAL—HOUSEHOLD

**FILTERS** Of All Types *and* Capacities . . . Gravity . . . Pressure

**SOFTENING SYSTEMS**
All Types *and* Capacities—Zeolites (*synthetic and natural*) and Lime and Soda

**CHEMICAL FEEDERS** (wet or dry)
Acids . . . Hypochlorites . . . Alkalies

**EQUIPMENT FOR REMOVAL**
Of Iron . . . Taste . . . Odors . . . Colors . . . Suspended Matter

**SWIMMING POOL EQUIPMENT**
**AERATORS · DE-GASIFIERS**
**WATER TEST SETS**
**RE-CARBONATORS**

*The* AMERICAN WATER SOFTENER COMPANY
WATER REFINING EQUIPMENT HEADQUARTERS
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**300 GALLONS OF WATER**
**for every person in America**

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For All Kinds of Plain-End Pipe Joining—Sizes ⅛" ID to 24" OD and larger.

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Long Sleeve

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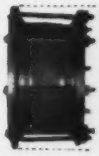
Insulating Coupling



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(Style 85)
For Cast Iron Pipe

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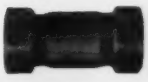

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(*Continued from page 8*)

In 1919, Stanley returned to the United States and became associated with Pearse and Greeley, now Greeley and Hansen, of Chicago. After three years as Resident Engr. in charge of sewer construction in Charleston, W.Va., and of construction of a water impounding dam at Decatur, Ill., he entered the Chicago office and was elected a junior partner. He had a major responsibility for the design, construction or operation of many water and sewerage projects throughout the country.

**W. Stewart Kuttler,** former San. Engr., Florida State Board of Health, Tampa, Fla., has been assigned to foreign duty with the United Nations Relief and Rehabilitation Administration. He has been serving as Asst. Engr. in the U.S. Public Health Service; first in the Malaria Control in War Areas division in Laurinburg, N.C., and then in the North Carolina State Board of Health. His home is in Keokuk, Iowa.

**B. G. Cole,** formerly Chief Chemist in charge of water purification, Monroe, La., Water Dept., has become Supervisor of the Water Purification Plant at Austin, Tex.

(*Continued on page 12*)

DIFCO

*Detection of Coli in Water*

This group of Difco Dehydrated Culture Media is recommended for the detection and confirmation of the presence of coliform bacteria in water. Each medium is prepared to conform to all requirements of "Standard Methods of Water Analysis" of the A. P. H. A. and A. W. W. A.

**Bacto-Lactose Broth**
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BRONZE
CASE
HERSEY
WATER METERS
again available in
5/8 to 1 inch
HERSEY MANUFACTURING COMPANY
SOUTH BOSTON, MASS.
BRANCH OFFICES
New York Portland, Ore. Philadelphia
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(*Continued from page 10*)

**Capt. W. W. Towne, Sn.C.,** has been assigned to the Hq., Second Army, Memphis, Tenn. Captain Towne was former State San. Engr. in the South Dakota State Board of Health. During 1941 and 1942 he was on leave of absence and served as visiting Asst. Prof. of Civ. Eng. at the Univ. of Missouri; and between that time and receiving his commission a year and a half ago, he served as San. Engr. in the U.S. Public Health Service, Cleveland.

**William D. Williams,** formerly Chief, Water Supply Section, Water Div., Office of War Utilities, WPB, has accepted the position of Div. Engr. with Morris Knowles, Inc., Cons. Engrs., Pittsburgh, Pa.

Prior to his association with the WPB, Williams was with Prouty Bros., Cons. Engrs., Denver, Colo., and with Giffels & Vallet, Inc., Cons. Engrs., Detroit, Mich. He was educated at Carnegie Institute of Technology, the Univ. of Pittsburgh and Duquesne Univ. During the first world war, he was posted at the Infantry Officers' Training School, Camp Gordon, Ga.

(*Continued on page 14*)

RECONVERSION to peacetime production in practically every field of industry will undoubtedly result in an unusually heavy demand for water works materials. Additions, alterations, replacements or complete new systems . . . new housing projects, street and road construction and repair . . . all require water works materials.

Hays has a complete line of stops and fittings for use with iron, copper, or lead pipe.

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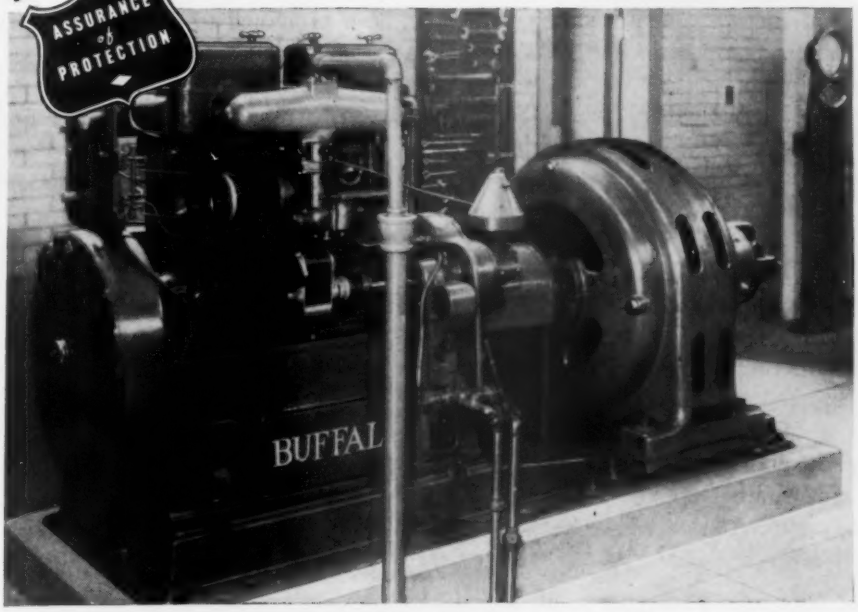
*BUFFALO Model RA-4 Engine. Direct-connected to a 75 Kva Generator. Sewage Treatment Plant, Norristown, Penna.*




**WITHOUT STAND-BY EQUIPMENT POWER FAILURE...*Breeds Disaster!***

Rapidly as repairs to power lines and equipment can normally be made, there is always time for disaster to strike during a breakdown. Fire underwriters, who know more about this than anyone, base their rates upon it as a fact; hence in any community, stand-by equipment pays for itself in insurance savings.

For assurance of protection, select BUFFALO Engines for motor generator or pumping sets. Their specifications will convince the engineer that they are completely trustworthy, and a visit to a Buffalo-powered station will prove to the operating man that here is the ideally clean, quiet-running and dependable motor for this service.

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BUFFALO ENGINES — 100 H. P. THROUGH 750 H. P.— IN GENERATOR AND PUMPING SETS FOR WATER WORKS — AIRPORTS — COMMUNICATIONS — FLOOD CONTROL — HOSPITALS — INSTITUTIONS — MINES — MOVABLE BRIDGES — THEATRES — SEWAGE PLANTS.

(*Continued from page 12*)

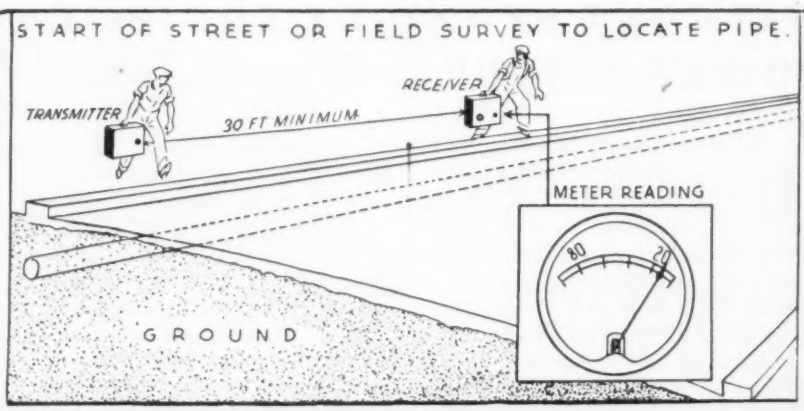
**W. G. McKay,** formerly Dist. Engr. in the Dept. of Pensions and National Health, Edmonton, Alta., has been promoted to the post of San. Engr. He was formerly Asst. Engr. at St. Catherines, Ont.

**R. F. Poston,** former State San. Engr. of New Mexico, Santa Fe, N.M., has been transferred by the U.S. Public Health Service to the Pan-American San. Bureau, El Paso, Tex., where he will deal with sanitation problems on the U.S.-Mexico border.

**Howard H. Potter** became associated with the Public Utilities Com. at Augusta, Me., on October 31, when he retired from active duty with the U.S. Public Health Service. He has been serving as Regional San. Engr. in the Office of Civilian Defense in Boston for the past year.

**Garrett Sloan,** former San. Engr., U.S. Public Health Service, Alexandria, La., is now Regional Engr., Southern Regional Office, Louisiana State Dept. of Health, Lafayette, La. He has just returned from Juneau, Alaska, where he was in the U.S. Public Health Service office.

(*Continued on page 16*)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***Exclusively manufactured by the Fisher Research Laboratory***

The M-SCOPE quickly locates the exact position of underground pipe-lines, bends, dead-ends, valves, cast iron bells, stubs, marble obstructions, etc. It determines depth of a pipe-line or metallic conductor. Traces exact course of underground line. It eliminates needless digging and tearing up—saves labor, materials and time.

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concentrated sanitation
ready for any emergency

This mobile chlorine carrier's 70% available chlorine swiftly restores sanitary conditions. It effectively destroys bacteria, objectionable odors and other contamination.

Packaged in 5-lb. cans, Sanitation HTH comes in handy for many every-day sanitation jobs, too. It's economical to use — dry and free-flowing. Use HTH for regular treatment of smaller water supplies, sewage effluents, and for efficient sanitizing of swimming pools.

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Sanitation HTH . . . Liquid Chlorine . . . Ph-Plus . . . Fused Alkali . . . Caustic Soda . . . Soda Ash
Bicarbonate of Soda . . . Bleaching Powder . . . Ammonia, Anhydrous & Aqua . . . Dry Ice
Carbonic Gas . . . Synthetic Salt Cake . . . Sodium Chlorite Products . . . Sodium Methylate

(*Continued from page 14*)

**Thomas R. Camp,** Cons. Engr., Boston, has succeeded to the consulting practice of the late Samuel M. Ellsworth and has moved to the offices formerly occupied by Mr. Ellsworth at 6 Beacon St., Boston 8.

**John J. Coates,** former Asst. Engr. with Sheppard T. Powell, Baltimore, is now Chem. Engr., with the Standard Oil Co. of Louisiana, Baton Rouge, La. Coates holds a master's degree in sanitary engineering from New York University.

**J. B. Wilson,** San. Engr., Indianapolis, Ind., has been commissioned a Captain in the Sanitary Corps and is assigned to the Grand Island, Neb., Air Field.

**David B. Lee,** former Chief Engr., Florida State Board of Health, Jacksonville, Fla., has been promoted from the rank of Captain to Major in the Sanitary Corps and is now on duty with the Health and Sanitary Div. He has been serving in the South Pacific.

(*Continued on page 18*)

**Prevent Rusting**

Rusta Restor cathodic protection, provides *permanent protection* against rusting of water tanks, piping and steel structures of all kinds.

Initial cost of a complete equipment is about equal to the cost of a good paint job. . . . Operation costs only about 2 mills (i. e. $0.002) per year per square foot of surface protected.

If your tanks and steel structures are not now protected by this proven low cost method, they should be. No obligation. Send for fully descriptive literature today.

**RUSTA RESTOR**

Division of

THE JOHNSTON & JENNINGS CO.

862 Addison Road, Cleveland 14, Ohio

**EDSON**

**DIAPHRAGM PUMPS**

*Hand Operated--sizes 2", 2½", 3", 4"*
*Power Operated--sizes 3" and 4"*

*Open Discharge or Force Pump*
*Skid, Truck or Trailer Mounted*

COMPLETE PUMP OUTFITS

*Edson Pumps - Suction Hose*
*Brass Couplings - Bronze Clamps*
*Red Seal Diaphragms*
*Brass Strainer or Foot Valve*
*Hose Spanners - Adapters - Etc.*

*Also*—Brass Hydrant Pumps

THE EDSON CORPORATION

Main Office and Works: 49 D St., South Boston, Mass.

New York, 142 Ashland Pl., Brooklyn

# *The* SIMPLEX
# SAND EXPANSION GAUGE

**PUTS THESE**
**WASH WATER FACTS**
***At Your Command!***

1 What wash water rate to use for maximum efficiency.
2 How long the proper wash period should be.
3 When optimum expansion has been reached.
4 What velocity and intensity of surface wash is needed.
5 What the optimum requirements of the wash period are.

*Accuracy within 2% of actual sand expansion in all sizes and types of filter beds.*

The Simplex Sand Expansion gauge gives accurate facts about your filter washes which make it possible to arrive at the perfect wash water cycle for any given plant — in any period of the year. The obvious savings in wash water, filter material, time, and labor, make this dependable unit a vital part of your filtration plant equipment. In conjunction with the Simplex Wash Water Controller, the Sand Expansion gauge may provide complete automatic control of the preferred wash cycle.

This instrument is as easily installed in plants now operating as in plants under construction. It responds within 2% of the actual sand expansion in all types and sizes of filter beds; gives trouble-free, dependable service, and is low in initial cost.

*Write today for full details on the inherent value of the Simplex Sand Expansion Gauge.*

**SIMPLEX VALVE & METER COMPANY**
**6784 UPLAND STREET, PHILADELPHIA 42, PENNA.**

(*Continued from page 16*)

**A "Bibliography of Solid Adsorbents"** has been compiled by Victor R. Dietz, Research Assoc. for the United States Cane Sugar Refiners at the National Bureau of Standards. The scientific literature on bone char, activated carbons and other solid adsorbents, for the years 1900 to 1942 inclusive, is covered in 6,002 entries. Each entry gives essential bibliographical data, together with a précis of the contents of the book or article. The "Bibliography" is the first comprehensive compilation on the subjects involved and constitutes a thorough presentation of fundamental knowledge in the field.

The Research Committee which co-operated in the compilation included Frederick J. Bates, Chief of the Optics Div. and of the Polarimetry Section of the National Bureau of Standards, to whom the volume is dedicated, and representatives of eight sugar refineries. James M. Brown, Chairman of the Committee, is distributing the book. He may be addressed at the Revere Sugar Refinery, 333 Medford St., Charlestown 29, Mass. The large, handsome, 877-page book, bound in black cloth and exceptionally legible, is priced at $12.00.

(*Continued on page 20*)

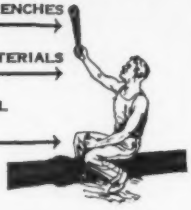
3 *Money, Time and Labor Saving Features of*

**UNIVERSAL CAST IRON PIPE**

LAID WITH ONLY WRENCHES

NO CAULKING MATERIALS

NO GASKETS. NO BELL HOLES TO DIG.



**For water supply, fire protection systems, sewage disposal systems, industrial, and irrigation. Flexible.**

*Dept. C*
**THE CENTRAL FOUNDRY COMPANY**
**386 FOURTH AVENUE, NEW YORK 16, N. Y.**

**Gentlemen: Send us information and catalog on UNIVERSAL CAST IRON PIPE.**

**NAME** _____

**STREET** _____

**CITY** _____

**HIGH QUALITY VALVES HYDRANTS**

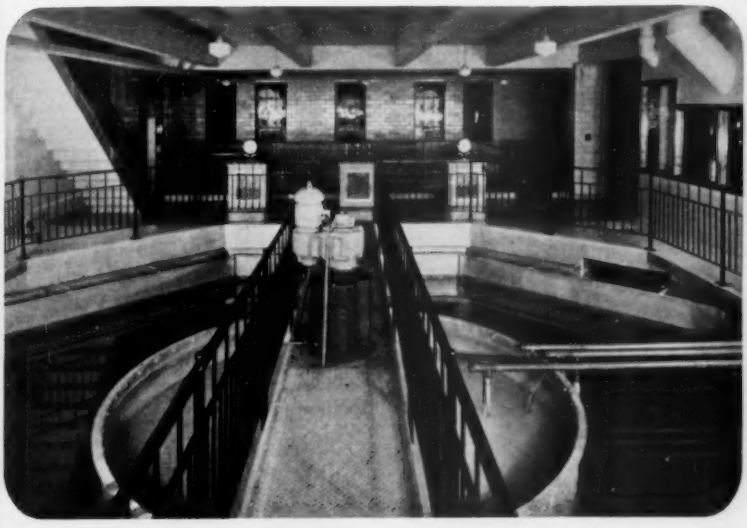
**M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34. Address M & H Valve and Fittings Company, Anniston, Alabama.**

*By this sign you will know*

INFILCO

***Half a Century of Experience* is back of the Water Conditioning and Sewage Treating Equipment Infilco Designs and Builds for You.**

**Take advantage of this. Standardize on Infilco Products — everything from Accelators to Zeolites. Place undivided equipment responsibility squarely on the shoulders of Infilco. You'll get better results.**



*2,000,000 g.p.d. Accelator Softener at Antigo, Wisconsin*

**There are Accelators for Softening, Clarifying and Stabilizing—and you can't beat them for *PERFORMANCE* and *ECONOMY*. Ask for Bulletin 1824.**

INFILCO
INCORPORATED
**325 W. 25th PLACE, CHICAGO 16, ILL.**

(*Continued from page 18*)

**A group of water and sewer contractors** operating in Texas, Oklahoma, Arkansas, Louisiana and New Mexico met in Dallas on July 27 and organized the Associated Municipal Contractors (Southwest Section). Officers elected were J. G. Bartholomew, Pres.; E. W. Sherman, Vice-Pres.; and F. S. Oldt, Secy.-Treas. The Executive Board is composed of Clyde Constant, Chairman, and the following members: Fred Dellone, Jr.; J. O. Johnson; O. J. Broughton; and Murphy Dalton. Their office will be at 311 Construction Bldg., Dallas, Tex.

The September *Southwest Water Works Journal* reports that: "The purpose of the organization is to bring about higher standards in specifications, methods and ethics throughout the utility and municipal construction field covering such works as water, storm and sanitary sewers and water and sewer plants in the southwestern states. Closer co-operation with government, municipal and private engineering firms in the handling and solving of such problems as those of useless benefit to the contracting parties and tend to the correcting of such abnormal demands which have arisen during war construction, as they should exist in the postwar future. All this will be of first interest to the new organization."

(*Continued on page 40*)

A GREAT HELP

IN SPEEDING THE JOB AND KEEPING LAYING AND MAINTENANCE COSTS DOWN

• Fast sealing of initial leakage • Permanently tight joints with far above average resistance to mechanical and thermal shock • Ingot form, with important advantages in ease of handling and immunity to moisture and to chemical composition change • Sound long range economy • You'll get all these in

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FOR JOINTING BELL & SPIGOT WATER MAIN

For more information, write

*The* ATLAS MINERAL PRODUCTS CO. *of Pa.*

Mertztown · Pennsylvania

Vogt

*Fire Hydrants*

Standard—"Traffic Model"—Flush Type—Water Crane Type

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*Gate Valves*

Non-Rising Stem—Outside Screw and Yoke—Hub End—Flanged End—Ends to Fit Any Type Pipe

*Also*—Floor Stands, Shear Gates—Tapping Sleeves and Valves—Flap Valves—Mud Valves

Vogt

Brothers Manufacturing Co., Inc.

Main at 14th Street, Louisville 3, Ky.

MUELLER-COLUMBIAN • THE ACCEPTED STANDARD

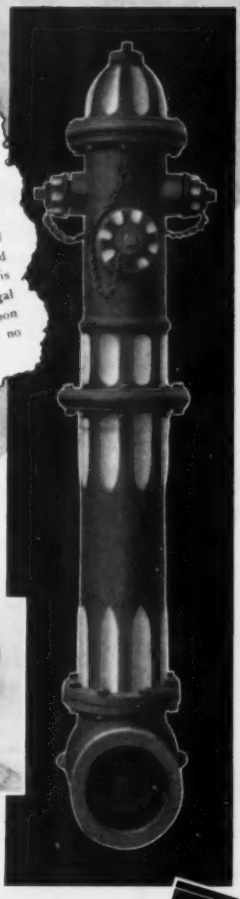
# WHO PAYS FOR YOUR BROKEN HYDRANTS?

**Read what Minneapolis has to say about it in this clipping from the May 1944 issue of the "Journal of A. W. W. A."**

The records also show the existence of 7,330 hydrants in the system. Each year about 70 to 80 hydrants are broken by traffic.

It is frequently difficult to collect for damage to hydrants by traffic. Usually such damage is the result of a collision or a maneuver to avoid collision and the "other fellow" is blamed. After arguments and legal efforts the burden of cost falls upon the water department, which is in no way responsible for the damage.

After all is said and done YOU pay for broken hydrants. And if you have 70 or 80 such accidents in a year, as Minneapolis does, your department will have to assume a heavy bill for hydrant upkeep. Why not eliminate the whole problem by switching to MUELLER-COLUMBIAN Fire Hydrants? The unique safety-flange and stem coupling (shown below) prevent damage to the hydrant barrel, stem, and working parts. There is no flooding of the street and the hydrant can be made like new in half an hour by one man. This is but one feature of MUELLER-COLUMBIAN Fire Hydrants. Write for new folder giving complete descriptions.



**MUELLER CO.**
CHATTANOOGA 1, TENN.
DECATUR 70, ILL.
LOS ANGELES 23, CALIF.

Here is the repair kit—all that is needed to make MUELLER-COLUMBIANS as good as new.

Actual photo of a MUELLER-COLUMBIAN hydrant after being hit by a truck.

Safety sleeve and safety coupling that protects the stem and threads from damage.

BUY MORE WAR BONDS!

Mueller-Columbian FIRE HYDRANTS

(*Continued from page 20*)

**Robert J. Boes,** former member of the Dept. of Health of Winona, Minn., is now Research Chem. Engr. of the Minnesota and Ontario Paper Co. at International Falls, Minn.

**L. E. Harper,** Pres. of the Omega Machine Co., which was formerly located in Kansas City, Mo., and is now a division of Builders Iron Foundry, Providence, R.I., has opened offices in the Peoples Gas Bldg., Chicago.

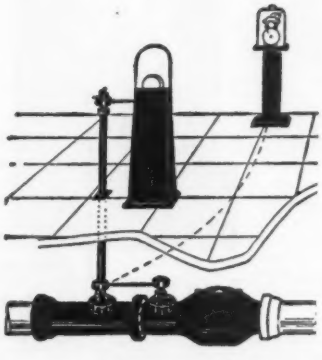
The Omega Machine Co., which was founded in 1928 by E. E. Harper, father of the company's present president, manufactures volumetric and gravimetric dry feeders, lime slakers and related accessories. The factory was removed on September 1 from Kansas City to Providence.

**Guy C. Northrop,** Pres., Northrop & Co., has reorganized his company, which is located at 50 Church St., New York 7, N.Y., and is now engaged in the active manufacture of "Bond-O," a sulfur-base jointing compound for cast-iron water mains. For the past sixteen years, Northrop was Gen. Sales Mgr. of Hydraulic Development Corp., promoters of

(*Continued on page 42*)


# SPARLING MAIN-LINE METERS

## *Types for all Main Lines*



**Sparling Compound Meter with Recorder and Mechanical Control to Chlorinator**

Accurate knowledge of main-line flows is indispensable. Sparling Meters, assuring consistent accuracy of measurement, are easily installed at comparatively little cost to give you complete information.

*Get the facts from Bulletin 308*

**SPARLING**

***Manufacturer of Water Measuring Equipment***

LOS ANGELES 54, Box 3277, Terminal Annex — 622 Broadway ..... CINCINNATI 2
CHICAGO 16 ..... 3104 South Michigan Ave. — 101 Park Avenue ..... NEW YORK 17
BOSTON 8 ..... 6 Beacon Street

WF

# Cast Iron Pipe

*Manufactured in Sizes 2" to 96"—*
*A large stock constantly on hand,*
*facilitating prompt shipment.*

**Bell and Spigot Pipe** **Special Castings**

**Flanged Pipe** **Flexible Joint Pipe**

**Short Body B. & S. Specials**

**Warren Spun Centrifugally Cast Iron Pipe**

## Warren Foundry & Pipe Corp.

*and*

**Warren Pipe Co. of Massachusetts, Inc.**

*Sales Offices*
11 Broadway, New York 4, N. Y.
75 Federal St., Boston 10, Mass.

*Works*
Phillipsburg, N. J.
Everett, Mass.

COOK Well Strainers

A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.

Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 40*)

another jointing compound, "Hydro-Tite." For eight years before then, Northrop was engaged in the sale of water meters. In addition to manufacturing and selling "Bond-O," Northrop & Co. will continue in the distribution of water works specialties and supplies.

Bert Seeholzer, Jr., formerly salesman with Hydraulic Development Co., has joined Northrop & Co. as Vice-Pres. He is working in a war plant at the present time, but will soon be engaged in promoting "Bond-O."

"Bond-O" will be represented in the middle Atlantic states by Ralph L. Kelly, in Florida by E. Harold Johnson, in the southeastern states by Ben F. Crabbe and in the Southwest by F. Victor Sohle.

(*Continued on page 44*)

Meter Boxes
Meter Testers
Meter Yokes & Couplings

Valve Boxes
Service Boxes
Manhole Covers

Street Castings
Special Castings

H. W. CLARK COMPANY
Mattoon, Illinois, U. S. A.

*Why not take time off and write a letter to the fellows in the service.*

They would rather have a letter from you than money from home.

STUART-BRUMLLY CORP.
516 N. Charles St.
Baltimore, Maryland

**Bring in a New Member**

HELP PROMOTE YOUR ASSOCIATION BY INTERESTING YOUR FRIENDS AND CO-WORKERS IN IT.

*Send for application blank*

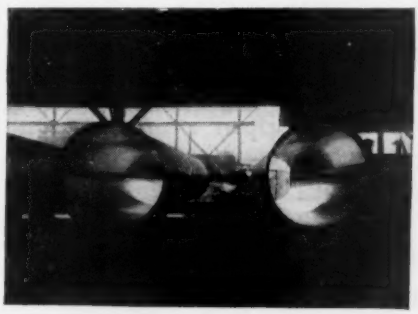
American Water Works Assn.
500 Fifth Avenue, New York 18, N. Y.

# reconditioning war-scarce steel pipe

IN 1934 a 36" diameter steel pipeline was fabricated, dipped and installed in the water supply system of Pasadena. In 1943, when the Metropolitan Water District of Southern California was instructed by W.P.B. to use old pipe from some other system, because of the scarcity of new steel, this pipe was abandoned by Pasadena and made available for the needed extensions to new war industries in the Los Angeles area.

When this 9-year-old line was removed it was found to be in such condition that it required careful reconditioning. This time it was lined and coated with Barrett Coal-tar Enamels, and relaid in its present location . . . effecting a great saving of war-scarce steel.

Time and again, old pipe has been salvaged by use of Barrett Enamel, and has given years of peak-capacity service. Barrett Enamels meet every specification of American Waterworks Association . . . give pipes long-lasting resistance to soil acids and electrolytic corrosion.



**FIELD SERVICE**—*The Barrett Waterworks Service Department and staff of Field Service men stand ready to provide a broad measure of cooperation. Services include consultation on technical details, training of crews, and job inspection.*

**THE BARRETT DIVISION**
**ALLIED CHEMICAL & DYE CORPORATION**
40 Rector Street, New York 6, N. Y.

Barrett
COAL-TAR ENAMEL

PALMER Filter Bed AGITATORS

Prevent Sand Beds From Cracking
Eliminate Mud Balls
Save Wash Water
Lengthen Filter Runs
Higher Rates of Filtration

ACTIVATED ALUM • BLACKALUM • PALMER FILTER BED AGITATORS
STUART-BRUMLEY CORP., 516 N. Charles Street, Baltimore - 1, Md.

(*Continued from page 42*)

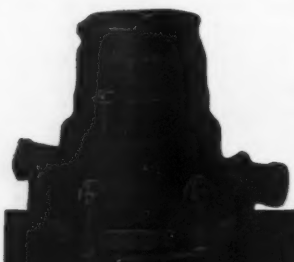
**An unusual wrench for water works men** is being developed in California. The wrench is open end, 180°, ratchet type, especially designed for connecting and disconnecting meters without removing the meter boxes. This new type of wrench will soon be marketed by Denman-Neuser Special Tools, 810 Santa Fe Ave., Los Angeles, Calif.

**The largest filtration plant in Central America** was dedicated at San José, Costa Rica, on September 17. The $250,000 plant will double the supply of pure water for that Central American capital. It was constructed under the terms of an agreement between the Costa Rican government and the Institute of Inter-American Affairs, an agency of the Office of Inter-American Affairs, Washington, D.C.

The filtration plant consists of three slow sand filters, ½ acre each, supported by concrete work calculated to resist the pressure engendered by currents and flows of water and stresses and strains originated by earthquakes in the area; a large sediment tank; chlorination apparatus; and mechanical sand washers for cleansing the filters.

(*Continued on page 46*)

NIAGARA IRON CASE WATER METERS



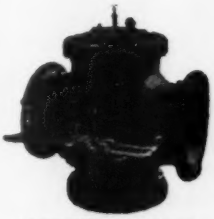
provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

WRITE FOR CATALOG.

BUFFALO METER COMPANY
Established 1892 2914 Main St., Buffalo, N. Y.

# 1879—ROSS—1879

## *Blueprint Now!*



ALTITUDE VALVE

Controls elevation of water in tanks, basins and reservoirs

1. Single Acting
2. Double Acting

Maintains safe operating pressures for conduits, distribution and pump discharge

SURGE-RELIEF VALVE

REDUCING VALVE

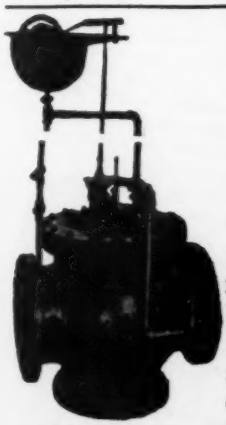
Maintains desired discharge pressure regardless of change in rate of flow

Regulates pressure in gravity and pump systems; between reservoirs and zones of different pressures, etc.

A self contained unit with three or more automatic controls

COMBINATION VALVE

Combination automatic control both directions through the valve.

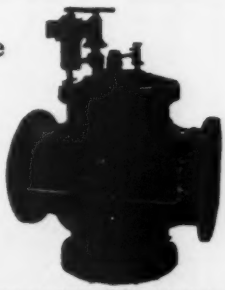


FLOAT VALVE

Maintains levels in tank, reservoir or basin

1. As direct acting
2. Pilot operated and with float traveling between two stops, for upper and lower limit of water elevation.

Electric remote control—solenoid or motor can be furnished



REMOTE CONTROL VALVE

Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

*Packing Replacements for all Ross Valves Through Top of Valve*

**ROSS VALVE MFG. CO., INC., P. O. BOX 593, TROY, N. Y.**

(*Continued from page 44*)

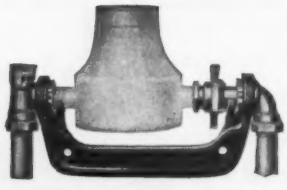
**An example of a book on how to plan postwar projects** in the sanitary engineering field is to be found in an excellent little publication issued by Indiana University and the Indiana State Board of Health under the title "Water and Sewerage Systems in Indiana." Although the booklet is designed to fit Indiana conditions only, it may become an inspiration and a point of departure for other states to find ways and means of making such collections of information.

The Indiana booklet is addressed to the mayors and superintendents in the state and provides them with all they need to know about the state laws which control the financing of such projects; about how to initiate a project and the stages through which it must pass before actual contracts are let—the informal or "caucus" stage, the ordinance or resolution stage, the preliminary report stage, the financial analysis stage and the final plan stage. Improvement or extension of existing water or sewerage systems as well as new construction is discussed.

Of value to Indiana men are the tables showing the assessed valuation of property in each city and town, as well as the bonded debt of each; and two maps, one showing where and exactly why sewage treatment is

(*Continued on page 48*)

FORD YOKES



*With the trend more strongly than ever toward greater accuracy and more frequent testing, the easy and trouble-free accessibility of a water meter set in a Ford Yoke makes this proven and perfected setting device most worth while.*

Catalog sent for the asking.

FORD METER BOX CO.
WABASH, IND.

RUSTOP
YOUR STEEL TANKS AND STANDPIPES

Corrosion . . . the worst "enemy" of your steel tanks and standpipes can now be licked completely and permanently . . . with RUSTOP.

RUSTOP is a cathodic method that removes old rust on submerged surfaces and keeps new rust from forming. It is a *permanent protection* . . . installed without interruption to service . . . at small cost . . . operates for only a few cents per month . . . eliminates necessity of sandblasting, scraping or painting. Is Guaranteed. Safeguard your tank. Cut down on tank repairs and maintenance. Investigate RUSTOP today.

No Paint, No Chemicals

RUSTOP
Dayton 10, Ohio, U.S.A.
ELECTRO RUST-PROOFING CORPORATION

# COMPLETE SELECTION in Socket Fittings!

Sleeve (Solid)
Fig. 521

Plug
Fig. 523

Flanged Socket
Fig. 528

Cap
Fig. 524

⅛ Bend
Fig. 507

¼ Bend
Fig. 501

Reducer
Fig. 526

Every type of socket fitting needed for water works construction and maintenance is included in Grinnell's line.

Special features of Grinnell Socket Fittings:

1. Improved design cuts size and weight and lessens friction losses.
2. All socket and spigot dimensions and wall thicknesses are the same as A.W.W.A. Standard Class "D" Pipe.
3. All fittings suitable for use with Super-deLavaud centrifugally cast Bell and Spigot Pipe.
4. Although listed for only 150 lbs. working pressure, suitable for 173 lbs. water pressure as specified for A.W.W.A. Class "D" Fittings.

*Write for Catalog 1,*

*"Water Works Specialties".*

GRINNELL COMPANY, INC.

Executive Offices: Providence 1, R. I.

**BRANCHES AND WAREHOUSES**

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| Atlanta 2, Ga. | New York 17, N. Y. |
| Charlotte 1, N. C. | Oakland 7, Cal. |
| Chicago 9, Ill. | Philadelphia 34, Pa. |
| Cleveland 14, O. | Providence 1, R. I. |
| Houston 1, Tex. | St. Louis 10, Mo. |
| Los Angeles 13, Cal. | St. Paul 2, Minn. |
| Minneapolis 15, Minn. | San Francisco 7, Cal. |

Seattle 1, Wash.

Tee
Fig. 514

Cross
Fig. 516

Split Sleeve
Fig. 522

Tee
Fig. 511

Warren Coupling
Fig. 533

Long ¼ Bend
Fig. 505

# GRINNELL

WHENEVER **PIPING** IS INVOLVED

*Charts and Reprints Available*

**The Calculation of Alkalinities and Free Carbon Dioxide in Water by the Use of Nomographs**

*By John F. Dye*

A COMPLETE REPRINT OF THIS ARTICLE (JOUR. A.W.W.A., 36: 895 (1944)) IS OBTAINABLE FROM ASSOCIATION HEADQUARTERS FOR 25¢.

THE VERY USEFUL CHARTS ARE INCLUDED BUT MAY BE OBTAINED SEPARATELY FOR USE FLAT IN THE LABORATORY. THEY SHOW THE RELATION IN WATER AT 25°C. BETWEEN PH, TOTAL ALKALINITY AND CARBONATE ALKALINITY, BETWEEN PH, TOTAL ALKALINITY AND BICARBONATE ALKALINITY AND BETWEEN PH, TOTAL ALKALINITY AND FREE CARBON DIOXIDE. THEY ARE SHIPPED IN A MAILING TUBE AND ARE FOR SALE IN THE UNITED STATES AND CANADA FOR 20¢ A SET.

STAMPS WILL BE ACCEPTED FOR ORDERS FOR BOTH ITEMS.

**AMERICAN WATER WORKS ASSOCIATION, INC.**
**500 Fifth Avenue, New York 18, N. Y.**

(*Continued from page 46*)

needed and the other showing where and what water works improvement is needed.

**The American Society for Testing Materials** has advanced publication of its usually triennial volume of specifications from November-December 1945 to December 1944, in order to answer the needs and demands occasioned by wartime production problems. The 6,000-page volume provides specifications and tests for a wide range of engineering materials, including metals, nonmetallic materials of the construction class (cement, lime, concrete, paint, etc.) and nonmetallic materials of a general type (petroleum, textiles, plastics, coal, rubber, etc.). A.S.T.M. headquarters are located at 260 South Broad St., Philadelphia 2, Pa.

**The Coleman pH buffer tablet** is a new product of the Burrell Technical Supply Co., 1936 Fifth Ave., Pittsburgh 19, Pa. The tablet provides a simple method of preparing buffer solutions for the laboratory. Available are tablets in steps of 0.20 pH over the range of 2.00 to 12.00

(*Continued on page 50*)

*Judged the Most Popular*

**ACTIVATED ALUM**

**BLACKALUM**

**PALMER SURFACE WASH SYSTEMS**

**STUART-BRUMLEY CORP.,**
**516 N. Charles Street, Baltimore - 1, Md.**

## K&M "Century" Pipe is

## ADAPTABLE...QUICK TO INSTALL

● As a time and labor saver—especially over troublesome terrain—the ready adaptability of "Century" Asbestos-cement Pipe is an important asset today. Its light weight, for example, means greater ease in handling and *smaller installation crews.*

Furthermore, "Century" flexible joints not only couple up faster, but permit wide radius curves without the use of elbows or bends. K&M "Century" Asbestos-cement Pipe is free of corrosion . . . unaffected by electrolysis . . . immune to costly tuberculation from within. There is no loss in pressure, no flow-hamper, no quick replacements needed when you specify "Century."

All this means real savings. With initial costs low and no expensive upkeep to worry about, a "Century" pipe line is a source of continued satisfaction and good will in the community.

Increased K&M facilities make K&M "Century" Asbestos-cement Pipe available NOW for approved municipal work.

**KEASBEY & MATTISON**
**COMPANY • AMBLER • PENNSYLVANIA**

## Wanted—March 1944 JOURNALS

**The Association's stock of JOURNALS for March 1944 is exhausted. If your copy is in good condition and you are willing to part with it, drop a postal card to Association headquarters. Fifty cents will be paid for each copy bought.**

**AMERICAN WATER WORKS ASSOCIATION**
**500 Fifth Avenue, New York 18, N. Y.**


(*Continued from page 48*)

pH. Solutions produced by dropping one tablet into 100 ml. of warm distilled water are accurate within 0.02 pH. The tablets come in hermetically sealed glass vials and, being dry, are not affected by bacterial action.

**The Propeloflo Meter** is a new propeller type flowmeter for transmission line metering now being produced by Builders-Providence, Inc., a division of Builders Iron Foundry, Providence, R.I.

The unit has an 8-blade bakelite propeller molded in one piece. Rotation is transmitted through spur and bevel gears, and shafts rotating in ball bearings supply power to drive indicating and recording devices or proportioning chemical feeders. A Venturi throat evenly distributes the force of the flow against the full area of the propeller, resulting in improved accuracy throughout a wide range of flow. Spiral flow is eliminated by straightening vanes just upstream of the propeller, while the propeller hub, bracket, and nose are streamlined to reduce flow disturbance and divert fine grit, sand, or scale away from the mechanism.

(*Continued on page 52*)


**THE COAGULANT THAT CUTS COSTS**

Write today for actual case histories of water plants now using Ferri-Floc.

TENNESSEE CORPORATION Ferri-Floc FERRIC SULPHATE

**TENNESSEE CORPORATION**
ATLANTA, GEORGIA LOCKLAND, OHIO

NO MORE WATER . . .

It's a hot day on Tarawa, in more than one way for these Marines, in their hastily thrown-up sand bag entrenchments. The canteen is empty — no more water. The smoke of battle, the sticky humidity and a hot, blazing sun all contribute to making this a trying time for these Marines. The heat of the Tarawa engagements made necessary ample supplies of pure drinking water and Navy Medical did a really magnificent job providing pure water supplies often under the most difficult conditions. It is gratifying to us at Hellige to know our instruments are contributing to the job of securing accurately tested water supplies, free from impurities.

HELLIGE, INC., 3718 NORTHERN BOULEVARD, LONG ISLAND CITY, N. Y

OFFICIAL U.S. MARINE CORPS PHOTOGRAPH

*PREVENT WEAR AND CUTTING of rods, plungers and shafts by using*

MABBS RAWHIDE PACKING

**An Ideal Packing for Water Works and Sewage Pumps and Valves**

**MABBS HYDRAULIC PACKING COMPANY, *Inc. 1892***

**431 S. Dearborn St., Chicago, Ill.**

(*Continued from page 50*)

**The "Municipal Finance News Letter"** of September 16 gives the following summary of activity throughout the country in "retirement matters":

*The Iowa League of Municipalities* at a recent meeting went on record favoring the enactment of a statewide actuarially sound retirement system for municipal employees on a joint contributary basis to be optional with each municipality. *Michigan municipal employees,* through the state municipal league, are working on a statewide retirement plan which will be ready to present to the Legislature in January 1945. Twenty-five states have retirement systems for judges, according to a report of the *Kansas Legislative Council.* In seven of the states the judges contribute to the retirement fund, while in eighteen they make no contributions. The matter of judicial salaries and retirement is dealt with in full in Report No. 127 of the Kansas Legislative Council, State Capitol, Topeka. The *U. S. Civil Service Commission* has published a comprehensive pamphlet entitled, "Your Retirement System—Questions and Answers Concerning the Federal Civil Service Retirement Law." According to Lewis H. Fisher, Chief of the Retirement Division of the Civil Service Commission, Congress has passed an act granting annuities to civilian officials and *employees of the Panama Canal and Panama Railroad* during the construction of the Canal from 1904 to 1914. It is estimated that approximately 1,900 persons will benefit. The annuities will go to people who had at least three years' service and will vary from 40 per cent of annual basic compensation to 60 per cent, depending on length of service. *State administered public employment retirement funds* had assets totalling $1,082,550,000 at the close of the 1943 fiscal year, according to the Bureau of the Census. During the year the revenue of all such funds consisted of employee contributions of $69,525,000, government contributions of $69,859,000, and investment earnings of $37,628,000. Payments to beneficiaries were $60,144,000. Of the total assets, teachers' retirement systems owned $774,737,000 and general retirement systems $295,255,000.

ZECO GREENSAND ZEOLITE

ZECO and HI–ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

**ZEOLITE CHEMICAL CO.**

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# NEWS OF THE FIELD

**Water works in these United States** need integration. One of the severest lessons drawn by the A.W.W.A. from the war is that public water supply has not recognized its entity within the states. Seventy-five per cent of all water works systems in the U.S. are owned by the communities which they serve. Many are administered in the old spirit of home-rule. "What we do and how we do it is our own business." That spirit is not in tune with the facts of life today.

For more than a generation, the various states have given water works one form of co-ordinating leadership through the activities of the State Sanitary Engineers. Water works men respect these engineers and follow their leadership. But their primary function is the preservation of quality of water—the public health angle.

We need that—and much more. What we actually need is a *state water authority* in every one of these United States—and perhaps even among our neighbors in the Dominion. A state water authority should control water resources and guide water supply operations first from the very important aspect of "who uses water for what." Control of water resources is imperative. It should next maintain the emphasis on water quality so well established by the State Sanitary Engineers. It should then guide the development of water supplies for the various cities, and, in the manner of the state boards of accounts, see to it that the financial structure of each water utility is sound and that the money is honestly handled. It should promote career service in water supply work by licensing.

Every one of these functions is now exercised by some agency in one or more states. These functions should be integrated and developed by all the states—in the interest of all the people. The intelligent development and control of water supply—the vital resource upon which individual and community life depends—calls for administrative guidance at state levels. Guidance and regulation, mind you, not state ownership, will give public water supply the organization that it needs. We need state water authorities with executive engineers at the helm—and the pattern of the man for this job is today's State Sanitary Engineer.

(*Continued on page 2*)

(*Continued from page 1*)

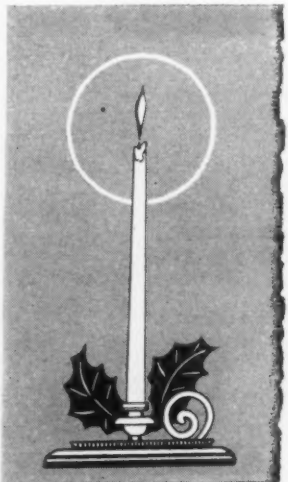
**Lt.Col. Jack J. Hinman Jr.,** Assoc. Prof. of Sanitation, University of Iowa, is en route to the Pacific, where he has been assigned to duties under the Corps of Engineers. He was previously commanding officer of an extensive secret project off the coast of Florida and was for a short while attached to the Chemical Warfare Board at Edgewood Arsenal, Md.

Colonel Hinman, who holds an A.B. and an M.S. in Chemistry from Butler University and a B.S. in Civ. Eng. and a C.E. from the University of Iowa, was President of the A.W.W.A. in 1930. He has also served the Association as Trustee, Vice-President and Director.

**Howard J. Sowden,** former Engr. in Charge of the Water and Sewerage Plants, Twin City Ordnance Plant, Minneapolis, reputedly the country's largest zeolite plant, has been appointed City Engr. of Fergus Falls, Minn.

After receiving a B.S. degree in electrical engineering from the University of Minnesota, Sowden was in charge of experimental water softening for Minneapolis for four years, and then became Chief Chemist for the city. In 1941 he published an article on the recovery of lime from water softening sludges in the JOURNAL.

(*Continued on page 4*)



····1869···· HAYS ····1945····

WE are fighting that the Spirit of Christmas may rule the world, and that each Happy New Year may be happier than the last. As we enter the 76th year of our business existence, we feel younger, stronger, and more confident of our own and our country's future prosperity than ever before.

Our seventy-five years of progress have been possible because our own efforts have been backed by the loyalty of our customers and the cooperation of our employees. Without that loyalty and cooperation we could never have accomplished our record of 1944, we could never have won the coveted Army-Navy "E".

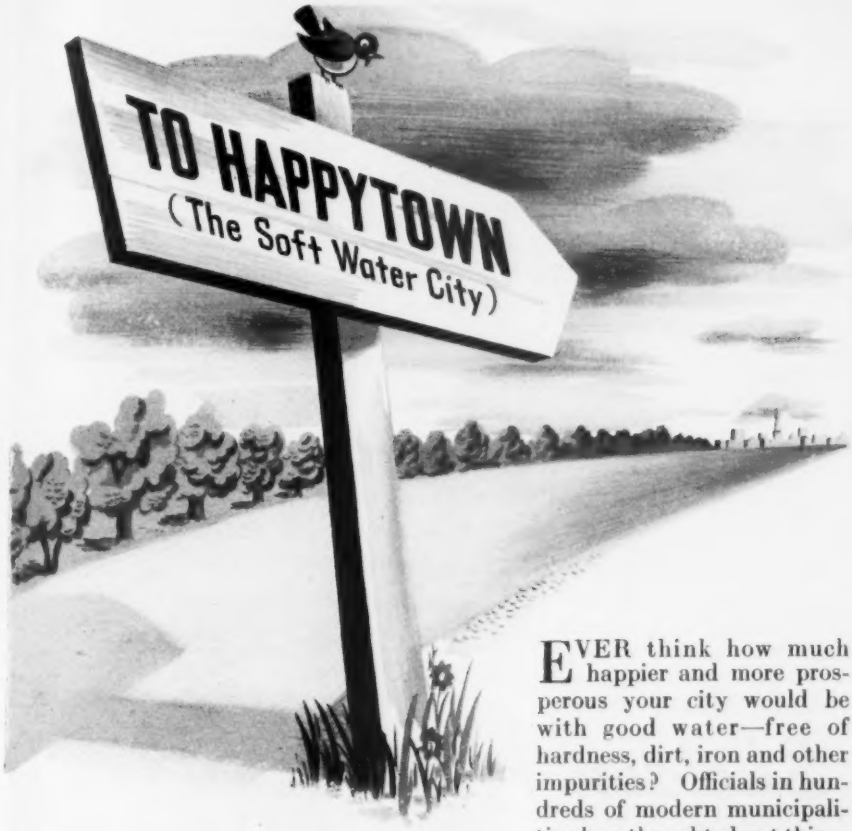
So let's join in a toast to the inseparable future success of all three of us; and to the continued Free Enterprise and Free Opportunity which make our success possible.

HAYS

COPPER · BRASS · LEAD · IRON

WATER WORKS PRODUCTS

HAYS MANUFACTURING CO., ERIE, PA.




EVER think how much happier and more prosperous your city would be with good water—free of hardness, dirt, iron and other impurities? Officials in hundreds of modern municipalities *have* thought about this—and have *done* something about it! They've installed Permutit* Water Conditioning equipment, and now enjoy soft, clear water from every faucet in town.

Put this postwar improvement at the head of your list—and earn the eternal gratitude of your citizens. Get the facts *now* about Permutit's economical equipment. Write to The Permutit Company, Dept. G2, 330 West 42nd Street, New York 18, N. Y., or Permutit Company of Canada, Ltd., Montreal.

* Trademark Reg. U. S. Pat. Off.

**SOFT, CLEAR WATER FOR MODERN CITIES ... IN 5 MINUTES!**

The "Spiractor" for cold lime soda water softening cuts detention time to as low as 5 minutes, leaves no sludge, makes big savings in steel and space.

**PERMUTIT**

WATER CONDITIONING HEADQUARTERS

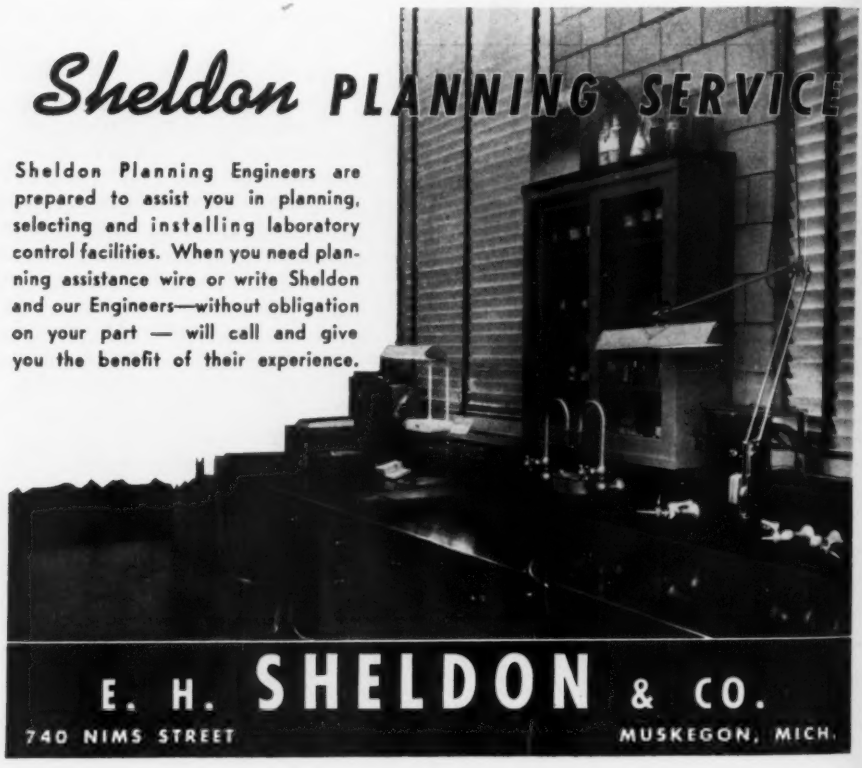
(*Continued from page 2*)

**Robert W. Furman,** Water Commissioner of Toledo, Ohio, died this fall. He was born in Blissfield, Mich., and attended the primary and secondary schools there. His first job was obtained in a sugar factory while he was still in high school, and it was there that he learned chemistry. A few years later he became head of the chemical laboratory of a sugar concern in Colorado. In June 1916 he joined the Toledo Water Plant and two months later he became Superintendent, a post which he held until he was appointed Commissioner. He was instrumental in bringing to Toledo its lake water supply system.

Mr. Furman had been a member of the A.W.W.A. since 1922.

**George Willard Reid** has resigned from his post as Asst. Prof. in the Hydr. Lab. of the College of Eng., Gainesville, Fla., to become a San. Engr. in the Indiana State Board of Health, Indianapolis.

(*Continued on page 6*)



Sheldon PLANNING SERVICE
Sheldon Planning Engineers are prepared to assist you in planning, selecting and installing laboratory control facilities. When you need planning assistance wire or write Sheldon and our Engineers—without obligation on your part — will call and give you the benefit of their experience.
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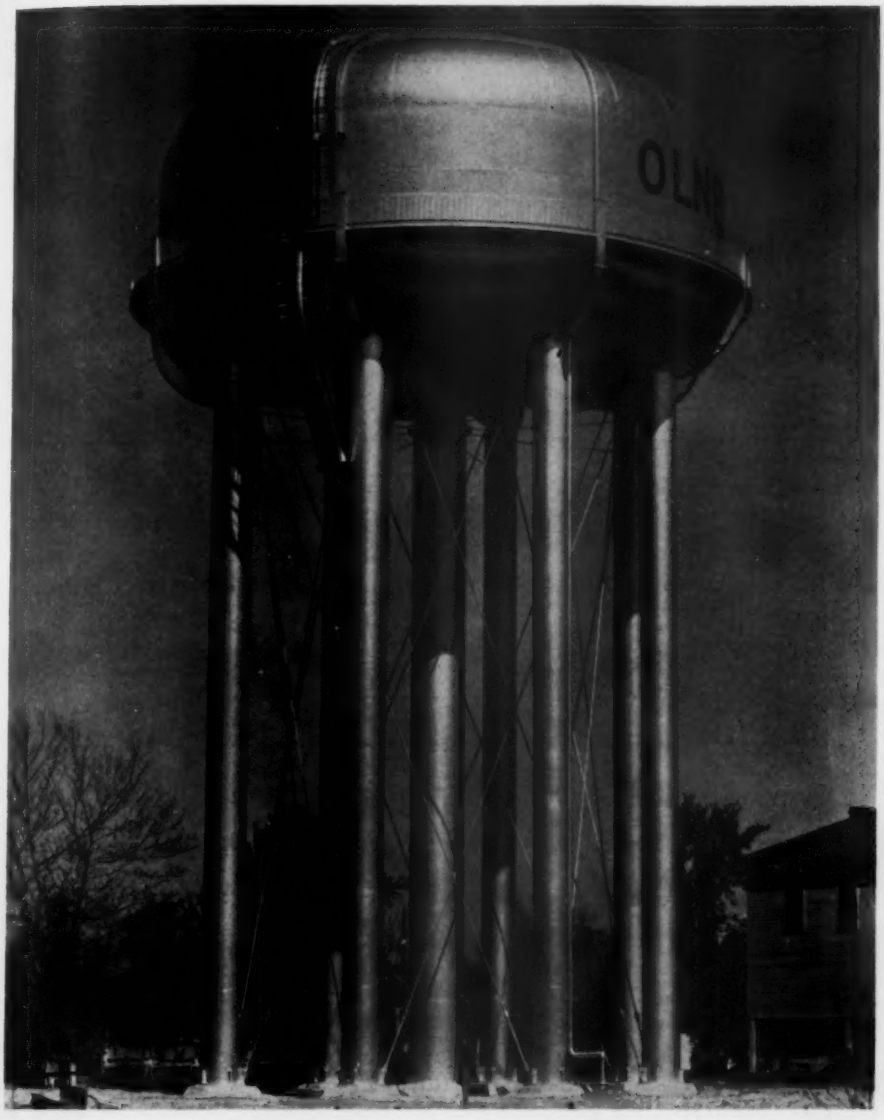


**RADIAL-CONE BOTTOM** elevated water tanks are built in capacities of 500,000 gals. or more with a relatively low range in head between the upper and lower water levels. Write our nearest office for estimates when planning installations.

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BIRMINGHAM
PHILADELPHIA
SAN FRANCISCO
CHICAGO
NEW YORK
HOUSTON
WASHINGTON
CLEVELAND
TULSA

(*Continued from page 4*)

**Charles H. Becker,** Narbeth, Pa., passed away on November 9 at the age of 51. He was Sales Manager of the Hydrant and Valve Dept. of the R. D. Wood Co., and had been associated with that firm since 1913. Prior to that time, he was with the Florence Pipe Foundry & Machine Co. He took office as President of the Water and Sewage Works Manufacturers' Association on November 2. He was a member of the Water and Sewage Works Development Committee.

Mr. Becker joined the Association in August 1927. He became a member of the Board of Directors on June 1, 1944, and had previously served on the Board from 1936 to 1939.

**William Donald Hurst** has been promoted from the post of Asst. City Engr. to City Engr. and Comr. of Buildings in Winnipeg, Can. **Clarence A. Keeping,** formerly Supt. of the Pumping Station at the Winnipeg Water Works, is now Engr. of Roads & Streets in Hurst's department.

(*Continued on page 8*)

**CYANAMID**

*Sulphate of Alumina*

CYANAMID through the control of its basic raw materials can assure you of a uniform high quality product at all times.

It assists in the removal of taste and odor.

It is and remains free flowing.

It is less corrosive than other coagulants.

It does NOT clog the dry feed machine.

It precipitates over a much wider pH range than other coagulants.

Your inquiry is invited on CYANAMID quality Sulphate of Alumina.

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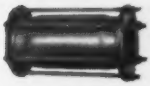
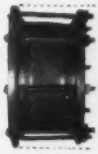
# A Complete Line MEANS Complete Service AND THAT'S DRESSER

**DRESSER STYLE 38 COUPLING**
For All Kinds of Plain-End Pipe Joining—Sizes ⅜" ID to 24" OD and larger.



**DRESSER STYLE 40**
Long Sleeve

**DRESSER STYLE 39**
Insulating Coupling



**DRESSER STYLE 62**
Reducing Coupling

**DRESSER STYLE 53**
Cast Coupling

**DRESSER BELLMASTER**
(Style 85)
For Cast Iron Pipe

**DRESSER STYLE 90**
Super-Service Fittings

The completeness of the Dresser line of pipeline products is an asset to everyone handling pipe. No matter how large or small the job, how simple or complicated, if pipe is to be joined—Dressers can join it.

Dresser makes over a hundred different pipeline products in every size from ⅜" to 96" in diameter—couplings, fittings, repair clamps, sleeves. Every Dresser product is ready-made. Some require only the simplest assembly. Others are completely factory-assembled, all ready to slip on and tighten. In either case the only tool ever needed is a wrench.

To users of Dresser Products the versatility of the line, the complete size range, and the speed with which Dressers join or repair pipe mean time and money saved.

Send us your inquiries for any quantity—for any pipeline construction or maintenance work.

**Save Man Power with Dresser Couplings**

*Canada: Dresser Manufacturing Co., Ltd., 60 Front St., West, Toronto, Ont.*

## DRESSER MANUFACTURING COMPANY

*ONE OF THE DRESSER INDUSTRIES*

BRADFORD, PENNSYLVANIA

*Houston Office and Warehouse: 1121 Rothwell St., Houston, Texas*

COOK Well Strainers

A reciprocal relation, the life and functioning of the one depending much on the other.

A. D. COOK, INC.

Lawrenceburg - Indiana

COOK Deep-Well Turbine Pumps

(*Continued from page 6*)

**Daniel H. Rupp,** Production Engineer, Topeka, Kan., Water Dept., died ten minutes after he was struck by a train on October 23. Railroad tracks run by the Topeka Water Plant and Mr. Rupp was watching a train pass when a troop carrier came from the opposite direction and, because of the noise of the train he was watching, he failed to hear it coming. Observers shouted warnings, and the locomotive engineer attempted to stop his train but was unable to do so in time.

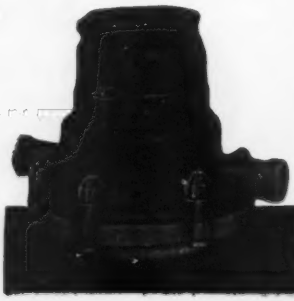
Mr. Rupp was born in Reading, Pa., in 1896. During his youth he traveled widely, studying water works systems in India, Turkey, Egypt and several European countries. When the last war came he was serving in the water purification department of the government water works division in Washington, D. C. He later functioned in a similar capacity in Ohio. From there he went to Oklahoma City where he was Water Chemist until 1930, when he became Production Engineer at Topeka.

Mr. Rupp won the Fuller Award for the Missouri Valley Section in 1944, at which time he was cited "for his outstanding achievements in connection with operating problems connected with water purification and water softening, and for valuable services on A.W.W.A. committees assigned to that subject."

Mr. Rupp joined the A.W.W.A. in 1922.

(*Continued on page 10*)

NIAGARA IRON CASE WATER METERS

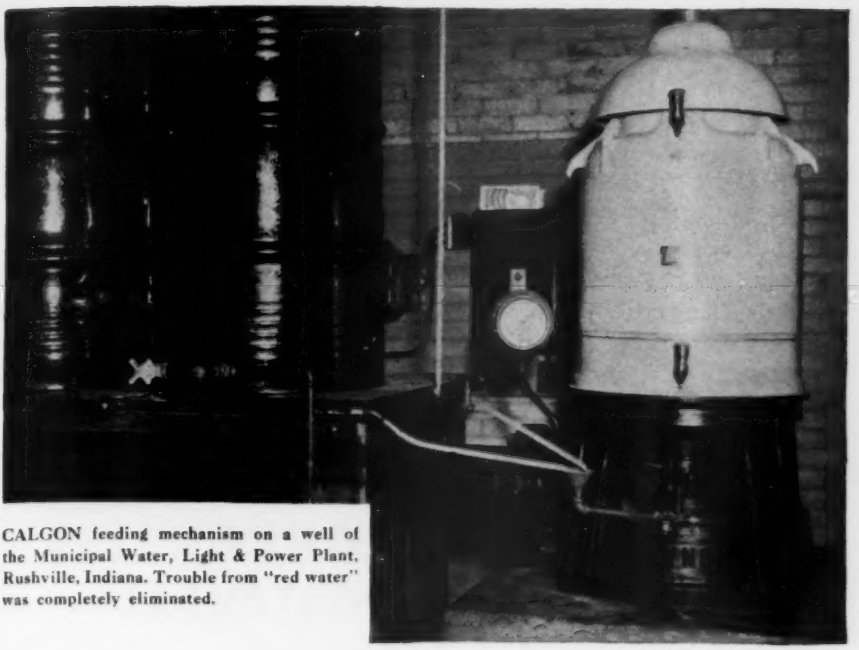


provide wartime copper conservation plus the time-proved Niagara design. They comply with victory-meter limitations. Works are interchangeable with American Bronze Case Meters.

WRITE FOR CATALOG.

BUFFALO METER COMPANY

Established 1892 2914 Main St., Buffalo, N. Y.



CALGON feeding mechanism on a well of the Municipal Water, Light & Power Plant, Rushville, Indiana. Trouble from "red water" was completely eliminated.

# "Red Water" complaints stop when Calgon Treatment starts

DUE to the presence of 1.6 ppm. of iron in the well water, complaints of "red water" were numerous at Rushville, Indiana. They were accepted as normal and this condition as something to be endured until an iron-removal plant could be installed.

But then they heard about Calgon and its action in stabilizing dissolved iron in well water, and thus preventing such troubles with "red water" and iron stains.

In July, 1943, Mr. D. A. Long, Superintendent, started Calgon Treatment with a feed of 3.2 ppm. Results were immediate and extremely satisfactory. Complaints stopped and none have been received in fifteen months.

Calgon Treatment is safe, simple, and economical. For instance, the cost at Rushville is only $4.00 per million gallons.

Calgon Treatment is equally successful in preventing "red water" from corrosion or in stopping deposition of calcium carbonate scale. The treatment is similar. Write for complete information.

## Calgon solves 4 water works problems

1. **Prevention of scale** from hard, high-bicarbonate waters. Calgon, added at the plant, prevents scale formation in mains, meters and hot-water heaters, throughout the system.

2. **Corrosion control**—Calgon forms a thin protective film on metals and metal oxides at pH values of 5.0 and higher. This reduces the attack of oxygen to such an extent that corrosion ceases to be a problem.

3. **Prevention of "red water"**—Calgon prevents the precipitation of dissolved iron. Thus "red water," either from iron initially present in well water, or from corrosion, can be eliminated.

4. **Stabilization of water** following lime or lime-soda softening. Calgon's ability to prevent precipitation of calcium carbonate stabilizes water to the ends of the system.

*Calgon is the registered trade-mark of Calgon, Inc., for its glassy sodium phosphate products.

HAGAN HALL BUDOMIN CALGON

calgon, inc.

A SUBSIDIARY OF HAGAN CORPORATION

HAGAN BUILDING

(*Continued from page 8*)

**Harvey C. Lawrence,** for 22 years Superintendent of the Powell Valley Road Water District, Portland, Ore., died this summer after an illness of several years.

Mr. Lawrence was born in South Dakota in 1882 and was educated in Oshkosh, Wis. After graduation from normal school, he joined his father in the lumber business in northern Wisconsin, and from there the two men went to Idaho where they took charge of another lumber company. In 1922, Mr. Lawrence left Idaho to join the Water District in Portland.

**George D. Sands,** University of Illinois, has devised a pencil for marking glass which can be made in any laboratory. He has suggested that the pencil be used for marking weights on vessels which are being weighed repeatedly instead of keeping the records separately. The pencil consists of a piece of carborundum fastened to the end of a portion of 8-mm. glass tubing by means of cement or sealing wax.

(*Continued on page 12*)


# SAVE FOR VICTORY

**EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.**

***Now is the time to do your part—SAVE FOR VICTORY***

## National Water Main Cleaning Co.

**30 Church St., New York, N. Y.**

**BRANCHES**

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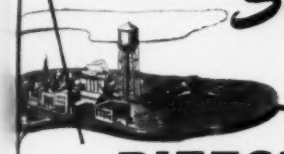
MAKE YOUR TOWN A BETTER TOWN

. . . when the boys come home!

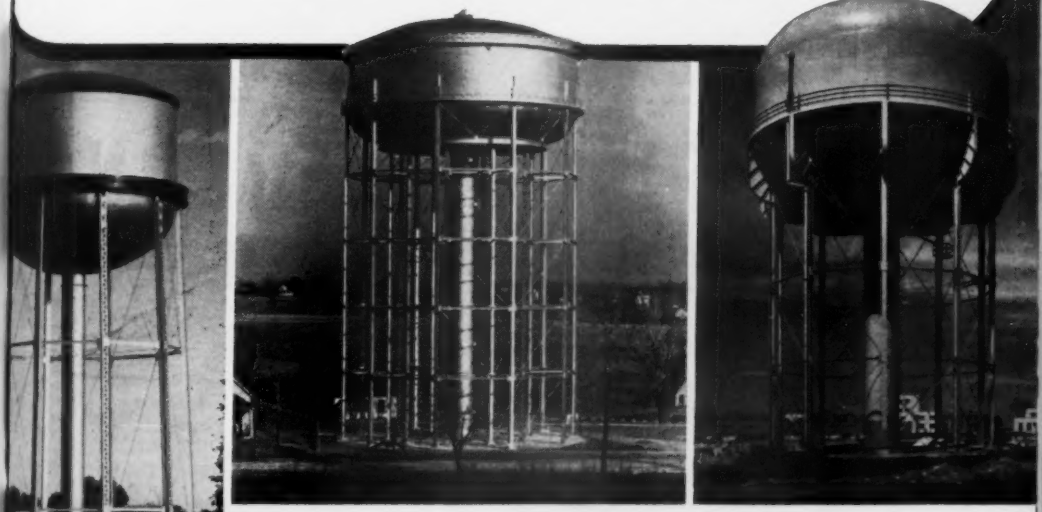
# BLUEPRINT NOW

## for Better Water Storage



WITH

## PITTSBURGH · DES MOINES
## ELEVATED STEEL TANKS



A better standard of living for your locality in the post-war years may wel include an improved water system. If you contemplate the construction o elevated water storage facilities at war's end, *plan now* to best advantage! The resources of our engineering staff are at your disposal—we invite you to use ou assistance in expediting the planning of your project. Write to our nearest office

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SEATTLE, 1132 EIGHTH AVENUE, SOUTH

(*Continued from page 10*)

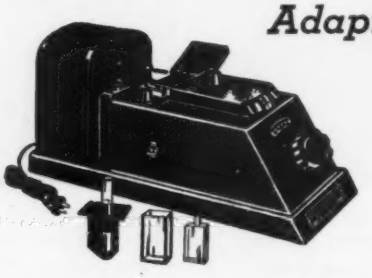
**Thomas C. Clifford,** former Sales Manager of the Pittsburgh Meter Co., passed away on October 19, at the age of 75. He was formerly associated with the Equitable Life Assurance Co. and was a member of the Engineers' Society of Western Pennsylvania. Although Mr. Clifford is not a member of the Association, he will be remembered by many for his interest and participation in the water works field.

**Harold A. Stepleton,** Cons. San. Engr., Toledo, Ohio, recently completed eighteen months' work with the Engineering Faculty at the University of Toledo, where he was in charge of the Physics Laboratory during the Air Cadet Training period. Stepleton has returned to private practice and is now a member of the staff of Floyd G. Browne & Assocs., Marion, Ohio, Cons. San. Engrs. on water supply, sewage and industrial waste treatment.

(*Continued on page 14*)

KLETT SUMMERSON
ELECTRIC PHOTOMETER

*Adaptable for Use in Water Analysis*



**Can be used for any determination in which color or turbidity can be developed in proportion to substance to be determined**

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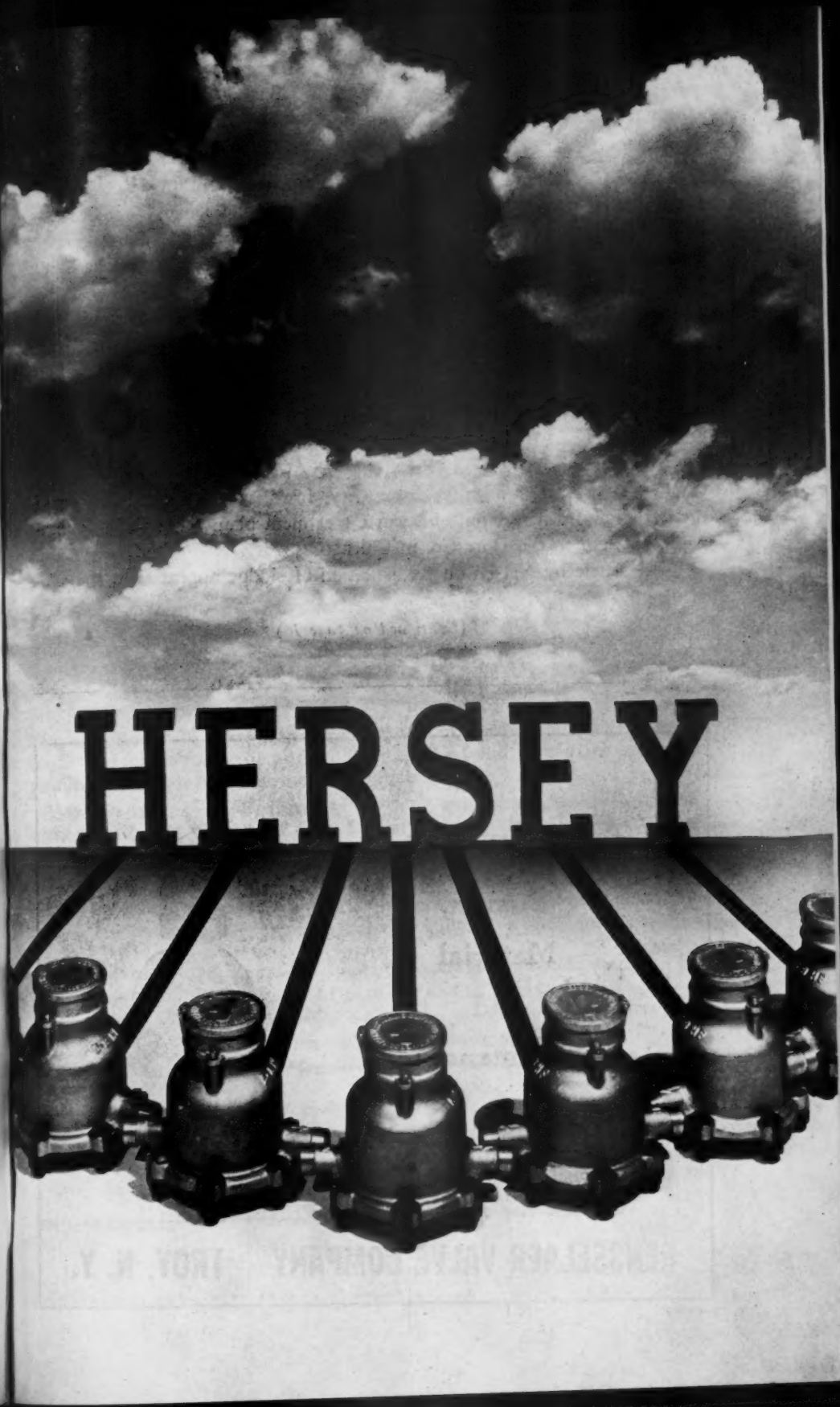
HERSEY

(*Continued from page 12*)

**Fred G. Nelson,** Asst. Mgr. of the San. Eng. Div. of the Dorr Co. for the past fifteen years, has transferred from the Dorr Co.'s Chicago office to Los Angeles. In Chicago, he was Dist. Mgr. for the central states. He will now act in the same capacity for eleven states in the West Coast District.

Nelson was graduated from the Univ. of Calif. at Berkeley in 1924 with a B.S. degree in sanitary engineering. He spent two years with the Chester H. Loveland Engrs. in San Francisco on the design and evaluation of water systems and was then for one year Asst. City Mgr. of San Rafael, Calif. In 1927–28, he was a research fellow at the Engineering Experiment Station at Iowa State College where he received his M.S. degree in sanitary engineering and bacteriology. After a short period with the Currie Engineering Co. of Webster City, Iowa, where he had charge of the design and construction of a waste treatment plant for a packing company, he went to the Dorr Co. in Chicago.

An article by Nelson on recalcination of sludge appeared in the November JOURNAL.

(*Continued on page 16*)

***Proven*** **quality of**

**Design,**

**Material**

**and**

**Workmanship**

***"Ask the man who uses*** **RENSSELAER"**

**RENSSELAER VALVE COMPANY TROY, N. Y.**

Austin, Texas—Modern Water Purification Plant Using Dorr Equipment

# WATER TREATMENT FOR ALL PURPOSES

The experience of The Dorr Company for over 30 years has covered water treatment for large and small municipal and industrial uses comprising any or all of the following operations:

**Color Removal • Softening • Iron and Manganese Removal**
**Mud and Silt Removal • Clarification • De-Ionization**

All of these steps are performed mechanically and continuously in well designed Dorr equipment:

**Dorrco Flash Mixer**—For instantaneously diffusing coagulating or softening chemicals.

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0582

(*Continued from page 14*)

**James G. Carns Jr.**, formerly Mgr., Bristol County Water Co., Bristol, R.I., has joined the Water Works Service Co., New York, N.Y. as an Asst. Div. Mgr.

**This Week,** the Sunday magazine section of the New York Herald Tribune, recently told the following story:

We have just heard about one of the finest examples of the good-neighbor policy on record:

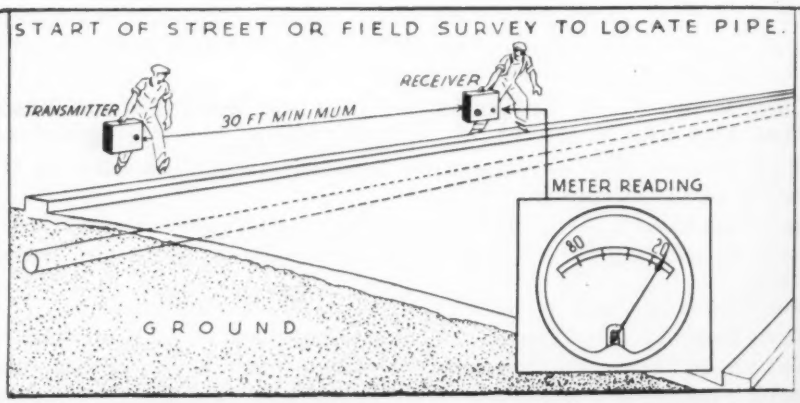
The U.S. lent Mexico a river to save 170,000 acres of vital, drought-hit crops.

The government report is matter-of-fact:

"From the All-America Canal in Southern California, the Bureau of Reclamation has just diverted a sizeable river of life-giving irrigation water, running at the rate of 4,000 cubic feet per second, to succor farmers in our sister Republic to the south. The amount of water involved is two times the domestic and industrial requirements of the City of New York, ten times those of Los Angeles, or twenty times the requirements of Washington, D.C."

We like the sound of the whole thing. It seems just as simple and natural as borrowing a gardening hose from the man next door—which is probably an important clue to a peaceful postwar world.

(*Continued on page 18*)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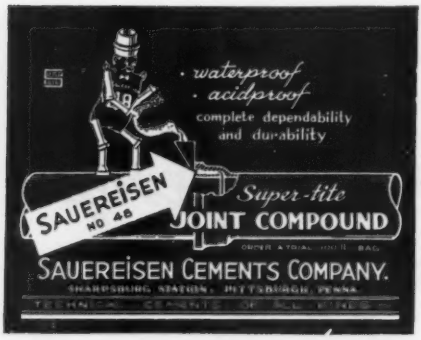


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(*Continued from page 16*)

## WEST VIRGINIA SECTION MEETING

The Sixth Joint Meeting of the West Virginia Section and Nineteenth Conference on Water Purification was held at the Chancellor Hotel at Parkersburg on October 26–27, with a registration of 117.

At the first technical session, Lawson Haynes and Wallace Grant, West Virginia Water Service Co., Charleston, W. Va., presented the results of experiments on taste and odor removal at water plants at Saint Albans and Nitro, W. Va. The Kanawha River is heavily contaminated with chemical plant wastes, and high pressure aeration through spray nozzles is effective in removing taste- and odor-producing substances.

Nickey Leshkow of Princeton, W. Va., in a practical talk, described methods of locating leaks in a small water system. The morning session was concluded with an open discussion of filter troubles led by Perkins Boynton of Clarksburg.

G. C. Sullivan, Regional Engr. of the War Production Board, explained the "Changing Trends in Materials and Equipment Which Affect Water Utilities." E. L. Borg, Technical Supt., United States Rubber Co.,

(*Continued on page 20*)

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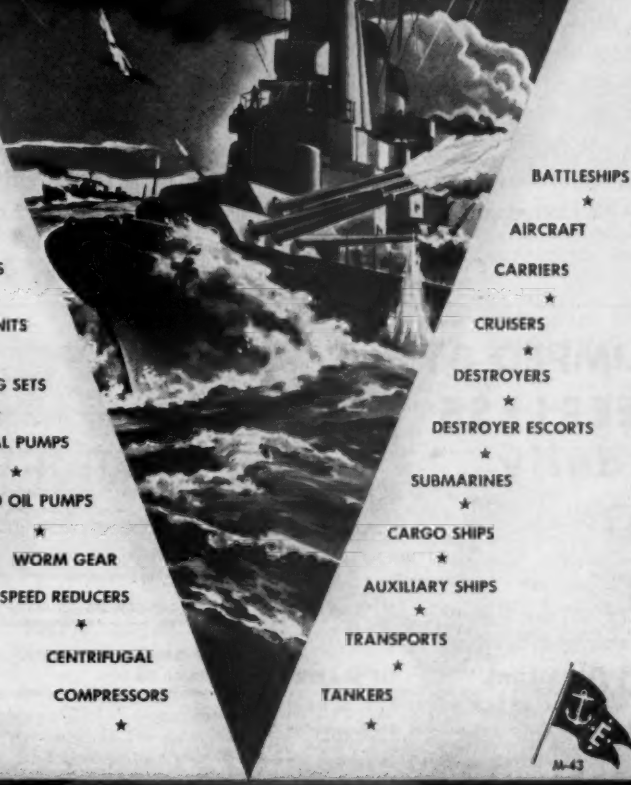

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(*Continued from page 18*)

Institute, W. Va., described the water treatment problems encountered in preparing Kanawha River water for use in the huge Institute synthetic rubber plant.

A "Gadget Contest" produced five devices. The first prize was awarded to Dennis Clark for a dual purpose gadget to transport and elevate a chlorine cylinder to platform scales. A combination meter box tool, entered by Cable Cramer of Kenova, won the second prize.

H. K. Gidley, Engr., State Dept. of Health, Charleston, W. Va., was nominated for the Fuller Award at the annual banquet, and the next morning he read a paper dealing with the surface water resource problems in West Virginia. This was followed by a talk by Noel Chamberlin of Wallace and Tiernan Co., who discussed "Recent Developments in Chlorine Control Tests." Frank Woodbury Jones of Cleveland, Ohio, delivered an address on "Weak Links in the Water Purification Chain" and pointed out some of the potential hazards often found in water plants. W. E. Holy, P. A. San Engr., U.S. Public Health Service, Washington, D.C., discussed the subject of cross-connections in a paper entitled "A Daily Dose of Danger or a Safe Water Supply?"

(*Continued on page 24*)

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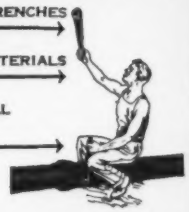

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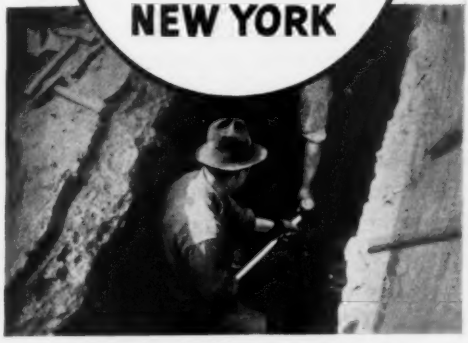

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CAST IRON

# SERVES FOR CENTURIES

(*Continued from page 20*)

In the final technical session, Arthur Todd of Wheeling and Paul Simmons of Weirton told of the extreme measures necessary to produce a palatable water from the Ohio River. R. M. Jeffords of the U.S. Geological Survey discussed "Ground Water Resources of West Virginia," and presented valuable information on subsurface water in the Ohio River gravel formations. M. J. Carmack, Kanawha Equipment Corp., Charleston, W. Va., read a very practical paper on "Installation and Maintenance of Centrifugal Pumps." In the final talk, C. E. Records of the C. E. Records Co., Columbus, Ohio, described the new well construction at Parkersburg. The chief points of interest were the submersible pumping unit and the patented gravel well screen.

J. B. HARRINGTON
*Secretary*

## REPORT OF ROCKY MOUNTAIN MEETING

One-hundred twenty-eight water works and equipment men and guests registered for the Eighteenth Annual Meeting of the Rocky Mountain Section which was held at the Cosmopolitan Hotel in Denver, Colo., September 21–22.

Governor John H. Vivian of Colorado asked the assistance of the section members in solving the problems confronting the local government by helping to supply necessary jobs to discharged veterans of this war. He urged that plans be made by local communities now for any useful work that might be undertaken as soon as material and personnel are available. Necessary water and sewage works in the section will help to absorb returning veterans, he stated.

The afternoon session was started by Dr. Elroy Nelson of the Colorado State Planning Board, who also stressed the need for postwar

(*Continued on page 48*)

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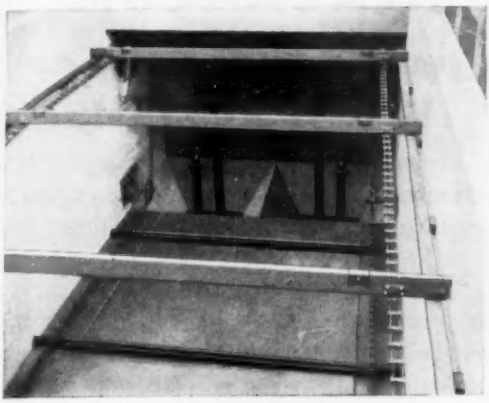

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**PALMER SURFACE WASH SYSTEMS**

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(*Continued from page 24*)

planning and stated that his board was trying to get legislative action taken to legalize the laying aside of funds by local communities so that they might construct needed improvements on the pay-as-you-go plan rather than by bond issues, which is the only legal method under present state laws. He also cited several instances where states have passed legislation to assist local communities in blueprinting now so that the state can, if asked to do so, advance up to 50 per cent of the cost of blueprinting, in an amount equal to 5 or 6 per cent of the estimated cost of construction. Dr. Nelson then outlined some of the difficulties encountered in perfecting a plan for assisting local committees in the planning and financing of needed improvements for different communities making up the state. These difficult problems, of course, vary in different states according to the existing laws and local conditions.

Major Gerald E. Arnold of the War Production Board presented "Priorities Brought Up-To-Date." "As you know," he said, "it was necessary to tie up tons of materials for service communications. Those conditions have changed with the changing course of the war. . . . The WPB

(*Continued on page 49*)

ZECO GREENSAND ZEOLITE

ZECO and HI–ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. Corexite mineral for corrosion and water stabilization.

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(*Continued from page 48*)

is concerned with war utilities—water, gas, power, and communications. Water is a primary problem in a good many western states."

John Strang, Kansas City, Mo., gave a talk entitled, "Recent Advances in Chlorination of Water."

The session on September 22 was opened by a paper on the "Relationship Between Bacterial Analysis and the Quality of Water" by W. V. Leonard, State San. Engr. for Wyoming, who paid tribute to such pioneers as Hazen, Fuller, Sedgewick and Whipple for their contributions and publications relating to water purification and distribution. He stated that both plant operators and equipment manufacturers are constantly improving the process of serving the customer with safe palatable water and discussed methods of quality control.

Next Jack Davis, Dist. Engr., Johns-Manville Sales Corp., presented a paper entitled "Tracing Cross-Connections" in which he stressed the necessity and importance of eliminating cross-connections between a polluted supply and a supply used for domestic purposes.

Glen Saunders, Asst. City Attorney for Denver, described the "Blue River Division Project," which is designed to bring water from the Western Slope to the Eastern Slope of the Rocky Mountains where it can be used more beneficially for power, domestic and irrigation purposes for Denver.

In a discussion of the short school for 1945 it was suggested that it might be advisable to have regional schools for beginners and a main school for advanced pupils; or each state might wish to hold its own school; or there might be one school, part of which would be devoted to beginners and part to advanced pupils.

The balance of the afternoon session was devoted to a round table discussion based on a series of questions previously used at the 1944 meeting of the Minnesota Section.

The George Fuller Award went "to Chester Arnold Truman for outstanding services to the Rocky Mountain Section of the A.W.W.A. as a loyal member, a tireless worker, and most capable director of the Association representing the Rocky Mountain Section."

O. J. RIPPLE
*Secretary-Treasurer*

(*Continued on page 50*)

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**An Ideal Packing for Water Works and Sewage Pumps and Valves**

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(*Continued from page 49*)

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Journal of the
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Vol. 36 October 1944 No. 10

Two Parts—Part 2

# MEMBERSHIP DIRECTORY

## COMMITTEES

## CONSTITUTION AND BY-LAWS

AMERICAN WATER WORKS ASSOCIATION
*Incorporated*
500 Fifth Avenue, New York 18, N. Y.

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Officers of the Association and its Sections or Divisions may obtain addressed labels from the membership list without charge if the application for such list is made in writing by the person requesting it and the use to which the name list is to be put is clearly stated and shown to be in conformance with the conditions laid down in the paragraph above.

Any member of the Association may purchase a set of addressed labels or cards by depositing with the Secretary an amount designated by him to cover labor and material, and by recording the exact use to be made of the list. If the designated use to which the list is to be put is not in accord with the intent of the first paragraph herein, the Secretary will not make the list available to the applicant.

Journal of the
American Water Works Association

Vol. 36 October 1944 No. 10

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# MEMBERSHIP DIRECTORY

## COMMITTEES

## CONSTITUTION AND BY-LAWS

AMERICAN WATER WORKS ASSOCIATION
*Incorporated*
500 Fifth Avenue, New York 18, N. Y.

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*To keep this directory up to date, there will be published in each issue of the* JOURNAL *a record of changes in membership and of changes in addresses and titles of members. Members can co-operate in keeping this record accurate by forwarding such information promptly to Association headquarters.*

# INTRODUCTION

THE American Water Works Association was organized in 1881 to "advance the knowledge of the design, construction, operation and management of water works." Its activities in part are developed through regional or state Sections, in part through general Divisions, in part through technical committees and in part through its monthly JOURNAL.

There are at present 25 regional or state Sections. The largest ones are in California and New York. Each Section has at least one meeting each year with attendance totals ranging from 100 to more than 1,000 persons interested in the field. Papers are presented; round table discussions are held; tests are made; exhibits frequently are available—all designed to improve water works design and management in the Section area.

There are three professional Divisions of the Association: Plant Management and Operation, Water Purification, and Finance and Accounting. The programs at the annual convention of the Association are built around the activities of these Divisions.

The technical work of the Association is organized under the Committee on Water Works Practice. This is a group of sixteen men, selected so as to provide a cross-section of the Association's field of interest, in the persons of leaders in the field. No technical pronouncements in the name of the Association are made until they are accepted by this committee and approved by the Board of Directors.

The Board of Directors has also established certain special committees to deal in fields of Association policy. At the present time such committees include "National Water Policy," "Social Security Legislation," and "Municipal Water Works Organization." A special committee on "Wartime Activities" devotes itself to problems derived from federal orders and rulings associated with the prosecution of the war.

A complete list of A.W.W.A. technical publications is given beginning on page 139 of this Directory.

The JOURNAL of the A.W.W.A. is a monthly publication which totals 2,500 pages per year. In it are found the papers and reports on water works subjects deemed to have permanent or major value to the field. About 250 pages annually are given over to abstracts of articles the world over which relate to all phases of water works affairs. No comparable cross-section of data exists elsewhere. An Index of Association publications for the years 1881 to 1939 is available.

The Association maintains headquarters at 500 Fifth Avenue, New York 18, N.Y., with a full-time staff of nine persons available for conference or correspondence on matters of general water works interest.

AMERICAN WATER WORKS ASSOCIATION
SECTION ORGANIZATION
1944

## LOCAL SECTIONS

There have been established 25 Local Sections, under the provisions of Article VII of the Association's By-Laws. Each of these Sections consists of the Association members who reside in the territory embraced by that Section. These Sections with the territory and the number of members in each are enumerated in this book on pages 17 and 18.

Each Local Section has its own officers, as listed each month in the JOURNAL. These officers are all selected by the Section itself under the provisions of the By-Laws of that Section. One of these officers is a member selected to represent his Section on the Board of Directors of the American Water Works Association, in accordance with Articles III and IV of the Association's Constitution.

The Local Sections each hold one or more meetings during the year, their practice in this respect, as well as the conduct of all of their business, being adapted to meet best the needs of their respective territories. Papers presented at the Local Section meetings are drawn upon for publication in the JOURNAL of the Association, as are also the papers presented at the Annual Convention of the Association.

Many of the Association's Sections hold each year one or more water works schools (conferences or in-service training institutes) and several co-operate in the procedure within their states which licenses the operators of water treatment plants. This is done in order to insure to the various communities as permanent and well-trained personnel as can be provided.

Each member and affiliate of the A.W.W.A. is automatically a member of the Section in which territory he resides, and there are no membership dues other than the regular Association dues, each Section receiving its funds from the Association.

## NATIONAL DIVISIONS

In accordance with the provisions of Article VII of the Association's By-Laws, the Board of Directors has established three National Divisions consisting of groups of the members who are particularly interested in certain branches of the water supply industry.

*The Water Purification Division:* This Division was organized originally as the Chemical and Bacteriological Section in 1913. The present name was adopted in 1925. The objects of this Division in particular are: the advancement of the science and art of water purification; the stimulation of research in the physical, chemical and bacteriological fields as related to the causes and effects of pollution and to methods of purification; and the promotion of progress in the design, construction and operation of water purification works.

*The Plant Management and Operation Division:* This Division was established in 1924. The objects of this Division, as stated in its By-Laws, are

the same as those of the Association, namely: the advancement of knowledge of the design, construction, operation and management of water works; and the encouragement, by social intercourse among its members, of a friendly exchange of information and experience.

*The Finance and Accounting Division:* This Division was established in 1929. Its objects are stated to be the same as those of the Association, and are particularly related to the accounting and financial operations incident to the operation of water works.

Any Active or Junior Member or Affiliate of the American Water Works Association may become a member of any one or more of these Divisions upon request, and with no further dues. The principal activities of the Divisions take place during the Annual Convention of the Association, at which time a number of the technical sessions are held under the auspices of the Divisions. Each of such meetings is presided over by the officers of the Division concerned and the subjects of discussion are those in which the Division is interested. The Divisions may also appoint committees for study, research and report upon subjects of interest to them. These committees act under the general supervision of the Association's standing Committee on Water Works Practice, if they have as their object the development of standards, specifications or manuals. If the committees are set up for the compilation of related facts and routine practices within the field of interest of the Division, the Committee on Water Works Practice exercises no supervision.

## CONVENTIONS AND PAST PRESIDENTS

*The President's term of office ends on the last day of the convention.*

| | | | | |
|---|---|---|---|---|
| 1 | St. Louis, Mo. | March | 29–31, 1881 | *John T. Foster |
| 2 | Columbus, Ohio | March | 14–16, 1882 | *John T. Foster |
| 3 | Buffalo, N. Y. | May | 15–17, 1883 | *John T. Foster |
| 4 | Cincinnati, Ohio | April | 15–17, 1884 | *John G. Briggs |
| 5 | Boston, Mass. | April | 21–23, 1885 | *L. H. Gardner |
| 6 | Denver, Colo. | June | 23–25, 1886 | *Peter Milne, Jr. |
| 7 | Minneapolis, Minn. | July | 13–15, 1887 | *B. F. Jones |
| 8 | Cleveland, Ohio | April | 17–19, 1888 | *J. T. Fanning |
| 9 | Louisville, Ky. | April | 16–18, 1889 | *A. N. Denman |
| 10 | Chicago, Ill. | May | 20–24, 1890 | *John H. Decker |
| 11 | Philadelphia, Pa. | May | 14–17, 1891 | *William Benedict Bull |
| 12 | New York, N. Y. | May | 17–19, 1892 | *John M. Diven |
| 13 | Milwaukee, Wis. | Sept. | 5–9, 1893 | *G. H. Benzenberg |
| 14 | Minneapolis, Minn. | Aug. | 21–23, 1894 | *James Peter Donahue |
| 15 | Atlanta, Ga. | May | 28–30, 1895 | *William Ryle |
| 16 | Indianapolis, Ind. | May | 26–28, 1896 | *William G. Richards |
| 17 | Denver, Colo. | June | 8–10, 1897 | *F. A. W. Davis |
| 18 | Buffalo, N. Y. | June | 14–18, 1898 | *John Caulfield |
| 19 | Columbus, Ohio | May | 16–19, 1899 | *Joseph A. Bond |

* Deceased.

| | | | | |
|---|---|---|---|---|
| 20 | Richmond, Va. | May | 15–18, 1900 | *R. M. Clayton |
| 21 | New York, N. Y. | June | 17–22, 1901 | *Charles E. Bolling |
| 22 | Chicago, Ill. | June | 10–13, 1902 | *William R. Hill |
| 23 | Detroit, Mich. | June | 23–26, 1903 | *Charles H. Campbell |
| 24 | St. Louis, Mo. | June | 6–11, 1904 | *L. N. Case |
| 25 | West Baden, Ind. | May | 9–12, 1905 | *Morris R. Sherrerd |
| 26 | Boston, Mass. | June | 26–30, 1906 | *Benjamin C. Adkins |
| 27 | Toronto, Ont. | June | 17–21, 1907 | *Dabney H. Maury |
| 28 | Washington, D. C. | May | 11–16, 1908 | *George H. Felix |
| 29 | Milwaukee, Wis. | June | 7–12, 1909 | *D. W. French |
| 30 | New Orleans, La. | April | 25–29, 1910 | *William Pitt Mason |
| 31 | Rochester, N. Y. | June | 5–10, 1911 | *John Watson Alvord |
| 32 | Louisville, Ky. | June | 3–7, 1912 | *Alexander Milne |
| 33 | Minneapolis, Minn. | June | 23–27, 1913 | *Dow R. Gwinn |
| 34 | Philadelphia, Pa. | May | 11–15, 1914 | *Robert J. Thomas |
| 35 | Cincinnati, Ohio | May | 10–14, 1915 | *George Goodell Earl |
| 36 | New York, N. Y. | June | 5–9, 1916 | *Nicholas Snowden Hill, Jr. |
| 37 | Richmond, Va. | May | 7–11, 1917 | *Leonard Metcalf |
| 38 | St. Louis, Mo. | May | 13–17, 1918 | *Theodore A. Leisen |
| 39 | Buffalo, N. Y. | June | 9–13, 1919 | Charles R. Henderson |
| 40 | Montreal, Que. | June | 21–25, 1920 | Carleton E. Davis |
| 41 | Cleveland, Ohio | June | 6–10, 1921 | Beekman C. Little |
| 42 | Philadelphia, Pa. | May | 15–19, 1922 | Edward Bartow |
| 43 | Detroit, Mich. | June | 21–25, 1923 | *Willard S. Cramer |
| 44 | New York, N. Y. | May | 19–23, 1924 | *George W. Fuller |
| 45 | Louisville, Ky. | Apr. 27–May 1, | 1925 | *Frank C. Jordan |
| 46 | Buffalo, N. Y. | June | 7–11, 1926 | *Harry F. Huy |
| 47 | Chicago, Ill. | June | 6–11, 1927 | *Allan W. Cuddeback |
| 48 | San Francisco, Calif. | June | 11–15, 1928 | James E. Gibson |
| 49 | Toronto, Ont. | June | 24–28, 1929 | William W. Brush |
| 50 | St. Louis, Mo. | June | 2–6, 1930 | Jack J. Hinman, Jr. |
| 51 | Pittsburgh, Pa. | May | 25–29, 1931 | George H. Fenkell |
| 52 | Memphis, Tenn. | May | 2–6, 1932 | Ross L. Dobbin |
| 53 | Chicago, Ill. | June | 12–16, 1933 | George W. Pracy |
| 54 | New York, N. Y. | June | 4–8, 1934 | Malcolm Pirnie |
| 55 | Cincinnati, Ohio | May | 6–10, 1935 | Harry E. Jordan |
| 56 | Los Angeles, Calif. | June | 8–12, 1936 | Frank A. Barbour |
| 57 | Buffalo, N. Y. | June | 7–11, 1937 | William W. Hurlbut |
| 58 | New Orleans, La. | April | 24–28, 1938 | Eugene F. Dugger |
| 59 | Atlantic City, N. J. | June | 11–15, 1939 | Reeves Newsom |
| 60 | Kansas City, Mo. | April | 21–25, 1940 | J. Arthur Jensen |
| 61 | Toronto, Ont. | June | 22–26, 1941 | Norman J. Howard |
| 62 | Chicago, Ill. | June | 21–25, 1942 | Louis R. Howson |
| 63 | Cleveland, Ohio | June | 15–18, 1943 | Abel Wolman |
| 64 | Milwaukee, Wis. | June | 13–16, 1944 | Samuel B. Morris |

* Deceased.

# HONORARY AWARDS

*The members listed below are also included in the Consolidated List of Members*

## *Honorary Membership*

Honorary Membership in the American Water Works Association is provided for in the By-Laws of the Association, Article I, Sections 1 and 2. The method of the election of Honorary Members is stated in the By-Laws, Article II, Section 1. The presentation of Honorary Memberships usually takes place during the Annual Convention of the Association. The present Honorary Members of the Association, with the year of their election to such membership, are as follows:

| | |
|---|---|
| John Walter Ackerman | 1941 |
| Moses Nelson Baker | 1936 |
| Frank Alexander Barbour | 1939 |
| Edward Bartow | 1936 |
| Thomas Brooks | 1937 |
| William Whitlock Brush | 1937 |
| George Cyrus Bunker | 1943 |
| Charles Baker Burdick | 1944 |
| James Morton Caird | 1942 |
| Edward Smith Cole | 1943 |
| William Roberts Conard | 1943 |
| Carleton Emerson Davis | 1939 |
| Wilfred Willis DeBerard | 1942 |
| Ross Leonard Dobbin | 1937 |
| George Harrison Fenkell | 1940 |
| James Edwin Gibson | 1940 |
| Frank Eugene Hale | 1944 |
| Roland Caldwell Harris | 1941 |
| Charles Robert Henderson | 1936 |
| William Whitehead Hurlbut | 1943 |
| Charles Gilman Hyde | 1939 |
| Harry Edward Jordan | 1939 |
| John Aspin Kienle | 1940 |
| Beekman Cox Little | 1939 |
| Daniel Webster Mead | 1930 |
| Denis Francis O'Brien | 1935 |
| William John Orchard | 1937 |
| James Lawrence Tighe | 1926 |
| William Edward Vest | 1942 |
| Thomas Hollis Wiggin | 1944 |

## *The John M. Diven Memorial Medal*

The John M. Diven medal was established by the Association in 1925 in memory of John M. Diven, a water works superintendent of many years experience and who served as the Association's President in 1892, Vice-Presi-

dent 1887–89, Treasurer 1890–91, 1903–13, Secretary 1890–91, 1903–23, and Editor 1914–16.

The award is made each year to the member who has rendered the most outstanding service to the Association during the year, as determined by a committee appointed for the purpose and whose report is subject to ratification by the Board of Directors. The medal is a bronze plaque bearing the likeness of Mr. Diven.

| | |
|---|---|
| George Warren Fuller | 1926 |
| Arthur Ellsworth Gorman | 1927 |
| Willard Samuel Cramer | 1928 |
| James Edwin Gibson | 1929 |
| Ross Leonard Dobbin | 1930 |
| Malcolm Pirnie | 1931 |
| William Whitlock Brush | 1932 |
| Samuel Brooks Morris | 1933 |
| Leonard Percy Wood | 1934 |
| Linn Harrison Enslow | 1935 |
| Harry Edward Jordan | 1936 |
| Abel Wolman | 1937 |
| William Curtis Mabee | 1938 |
| Hallett Francis Smith | 1939 |
| William Victor Weir | 1940 |
| William Whitehead Hurlbut | 1941 |
| Samuel Frank Newkirk, Jr. | 1942 |
| Earl Devendorf | 1943 |
| Louis Richard Howson | 1944 |

### *The John M. Goodell Prize*

The John M. Goodell prize was established in 1931 under the terms of an endowment by *Engineering News-Record* and as a memorial to John M. Goodell, a former editor of *Engineering News-Record* and the editor of the Journal of the American Water Works Association, 1917–21.

The prize is awarded annually to the member who has made the most notable contribution to the science or practice of water works development, usually as recorded in the form of a paper published in the Association's Journal. The selection is made by a committee appointed for that purpose and whose report is subject to ratification by the Board of Directors. The prize consists of an engraved certificate and the cash resulting from that year's income of the endowment, usually at least fifty dollars.

| | |
|---|---|
| John Robert Baylis | 1932 |
| Charles Herbert Spaulding | 1933 |
| Willard Townshend Chevalier | 1934 |
| Frank Eugene Hale | 1935 |
| Mathew Michael Braidech | 1936 |
| Laurance Edward Goit, Harry Hayes (Jointly) | 1937 |

| | | |
|---|---|---|
| Vance Christopher Lischer | | 1938 |
| Albert George Fiedler<br>David Grosh Thompson | Jointly | 1939 |
| Melvin Lorenius Enger<br>Thomas Hollis Wiggin | Jointly | 1940 |
| Paul Weir | | 1941 |
| Ray Freeman Goudey | | 1942 |
| Wilfred Francis Langelier<br>Harvey Fred Ludwig | Jointly | 1943 |
| Noel Stillwell Chamberlin<br>John Richard Glass | Jointly | 1944 |

### *The Nicholas S. Hill, Jr., Cup*

The Nicholas S. Hill, Jr., cup is an award which was established by Past President Nicholas S. Hill, Jr., during his term of office in 1915–16. It is awarded at each Annual Convention to that Local Section of the Association which has made the largest percentage gain in membership during the year.

Under the original terms of the award the cup was to become the permanent possession of the Section which first won it for three successive years. This was first accomplished by the Minnesota Section, but due to the unusual conditions then prevailing as a result of the war the Section returned the cup for continued competition. When the North Carolina Section won the cup for the third successive year in 1924 the Section returned it to the Association with the stipulation that no Section should again win it permanently. The names of the winning Sections are engraved upon the cup.

| | |
|---|---|
| Canadian Section | 1916 |
| Minnesota Section | 1917–'18–'19 |
| Canadian Section | 1920 |
| Central States Section | 1921 |
| North Carolina Section | 1922–'23–'24 |
| California Section | 1925–'26 |
| Florida Section | 1927–'28 |
| Pacific Northwest Section | 1929 |
| Southeastern Section | 1930 |
| Pacific Northwest Section | 1931 |
| California Section | 1932 |
| Montana Section | 1933 |
| Canadian Section | 1934 |
| Virginia Section | 1935 |
| Rocky Mountain Section | 1936 |
| Indiana Section | 1937 |
| Michigan Section | 1938 |
| West Virginia Section | 1939 |
| Southwest Section | 1940 |
| Pacific Northwest Section | 1941 |
| North Carolina Section | 1942 |
| Florida Section | 1943 |

### *The Franklin Henshaw Cup*

The award of the Franklin Henshaw Cup was established in 1934 as the result of a gift to the Association by Franklin Henshaw. At each Annual Convention this cup is awarded, for one year, to that Local Section which has held the best attended meeting during the year past. The best attended meeting is defined as that meeting at which the largest percentage of the Section's members are present.

| | |
|---|---|
| Montana Section | 1935 |
| Montana Section | 1936 |
| Indiana Section | 1937 |
| Pacific Northwest Section | 1938 |
| North Carolina Section | 1939 |
| Wisconsin Section | 1940 |
| Pacific Northwest Section | 1941 |
| Minnesota Section | 1942 |
| Minnesota Section | 1943 |

### *The Old Oaken Bucket*

The Old Oaken Bucket is a symbolic award which was established in 1939. It is awarded at each annual convention to that Section of the Association which has the largest membership. The trophy is a veritable antique from an old New England farmstead and is particularly appropriate as a water works trophy because of its rarity.

| | |
|---|---|
| California Section | 1939 |
| California Section | 1940 |
| California Section | 1941 |
| California Section | 1942 |
| California Section | 1943 |

### *The George Warren Fuller Memorial Awards*

These awards were established in 1937, and are given each year to members of the Association, designated by the Sections, for their distinguished service in the water supply field and in commemoration of the sound engineering skill, the brilliant diplomatic talent, and the constructive leadership of men in the Association which characterized the life of George Warren Fuller—one of America's most eminent engineers.

Each Section, each year, *may* designate one of its members to receive a Fuller Award. Such designation is presumed to recognize publicly the contribution toward advancement of water works practice the individual has made within the particular Section selecting him for the award. If two members have joined in a common project which the Section wishes to recognize, both participants may be jointly designated for the award.

These awards are in the form of an engraved certificate signed by the President and Secretary of the Association.

In 1942 the Fuller Awardees formed the "George Warren Fuller Award Society" which gathers each year in a breakfast meeting during the annual convention. The first president of this group was Wendell R. LaDue. The present president is Louis R. Howson, and the secretary is Rollo K. Blanchard. The names of all recipients of the George Warren Fuller Memorial Award follow:

**1938**

| *Name* | *Section* |
|---|---|
| Albert Edward Berry | Canadian |
| Joseph Eugene Lyles | Florida |
| Charles Matthias Roos | Illinois |
| William Curtis Mabee | Indiana |
| Ledereich Stuart Vance | Kentucky-Tennessee |
| Claude Wesley Eyer | Montana |
| Charles Herbert Capen | New Jersey |
| Edward Arnold Sterns | New York |
| Guy Haywood White | Southeastern |

**1939**

| | |
|---|---|
| Gerald Eugene Arnold | California |
| Abraham Martin Bowman | Canadian |
| Edward Carey Trax | Central States |
| Alvin Percy Black | Florida |
| James Wadsworth Armstrong | Four States |
| John Robert Baylis | Illinois |
| *Howard Albert Dill | Indiana |
| Hallett Francis Smith | Michigan |
| John William Pray | Missouri Valley |
| Frederick Elisha Brandis | Montana |
| William George Banks | New Jersey |
| Elon Powell Stewart | New York |
| Wendell Richard LaDue and *Willard Charles Lawrence | Ohio |
| *Alexander Lindsay | Pacific Northwest |
| Dana Ewart Kepner | Rocky Mountain |
| *Albert Andrew Passolt | Southeastern |
| Frank Walther Eduard Weisse | Southwest |
| Leon Albert Smith | Wisconsin |

**1940**

| | |
|---|---|
| Raymond Freeman Goudey | California |
| Theodore Joseph Lafreniere | Canadian |
| Carl Adam Hechmer | Four States |
| Charles Herbert Spaulding | Illinois |
| *Frank Carver Jordan | Indiana |
| Howard Dean Schmidt | Kentucky-Tennessee |
| Laurence George Lenhardt | Michigan |

| *Name* | *Section* |
|---|---|
| August Vincent Graf | Missouri Valley |
| Lincoln Van Gilder | New Jersey |
| Charles Raymond Cox | New York |
| Herman Glenn Baity | North Carolina |
| Thomas Ridgway Lathrop | Ohio |
| Ben Stogden Morrow | Pacific Northwest |
| Benjamin Varnum Howe | Rocky Mountain |
| Paul Weir | Southeastern |
| Leroy Henry Scott | Southwest |
| Marsden Churchill Smith | Virginia |
| Perkins Boynton | West Virginia |
| Louis Frederick Warrick | Wisconsin |

**1941**

| | |
|---|---|
| William Whitehead Hurlbut | California |
| Walter Moffat Scott | Canadian |
| Ralph Whitney Reynolds | Florida |
| Ivan Maxwell Glace | Four States |
| Frank Clifford Amsbary Jr. | Illinois |
| Paul Carl Laux | Indiana |
| John Powers Brownstead | Kentucky-Tennessee |
| Walter Leroy Mallman | Michigan |
| *Felix Seligman | Minnesota |
| William Merriam Cobleigh | Montana |
| David Leonard Erickson | Missouri Valley |
| George Riddell Spalding | New Jersey |
| Robert Gordon Yaxley | New York |
| Michael Frank Hoffman | Ohio |
| William Parker Hughes | Pacific Northwest |
| James Edwin Gibson | Southeastern |
| Victor Marcus Ehlers | Southwest |
| Chester Francis Drake | Western-Pennsylvania |
| John Bert Harrington | West Virginia |
| Arthur Peter Kuranz | Wisconsin |

**1942**

| | |
|---|---|
| Charles Gilman Hyde | California |
| Robert William Angus | Canadian |
| William Benjamin Gibson | Florida |
| Carl John Lauter | Four States |

| Name | Section |
|---|---|
| Herbert Edson Hudson Jr. | Illinois |
| Blucher Adams Poole | Indiana |
| Robert Paul Farrell | Kentucky-Tennessee |
| Douglas Feben Roberts Hulbert | Michigan |
| Ronald M. Finch | Minnesota |
| *William Theodore Bailey | Missouri Valley |
| Herbert Branch Foote | Montana |
| Joseph Arthur Carr | New Jersey |
| Rollo Kimball Blanchard | New York |
| William Christian Olsen | North Carolina |
| Hayes Robinson Kuhns | Ohio |
| Milton Hunt McGuire | Pacific Northwest |
| Oliver Jesse Ripple | Rocky Mountain |
| William Davis Moore | Southeastern |
| Edward Ray Stapley | Southwest |
| Dayton Rice Taylor | Virginia |
| *James Smith Dunwoody | Western Pennsylvania |
| Thomas Lee Young | West Virginia |
| Walter Anderson Peirce | Wisconsin |

**1943**

| | |
|---|---|
| Carl McKee Hoskinson | California |
| Norman Joseph Howard | Canadian |
| John Robertson Hoy | Florida |
| Seth Morton Van Loan | Four States |
| Louis Richard Howson | Illinois |
| Cecil Kirk Calvert | Indiana |
| Claude Manley McCord | Kentucky-Tennessee |
| Edward Dunbar Rich | Michigan |
| Arthur Franklin Mellen | Minnesota |
| William Victor Weir | Missouri Valley |
| Eugene Carroll | Montana |
| Samuel Frank Newkirk Jr. | New Jersey |
| Earl Devendorf | New York |
| Walter McKinney Franklin | North Carolina |
| Charles Potter Hoover | Ohio |
| Charles Clifford Casad | Pacific Northwest |
| Delbert Pinkney Porter Leonard Oliver Williams Jr. | Rocky Mountain |
| Borden Prather Rice | Southeastern |
| Egmont Schermerhorn Smith | Southwest |
| Eugene Frank Dugger | Virginia |
| Myron Gorton Mansfield | Western Pennsylvania |
| Mentor Hetzer | West Virginia |
| William Urnn Gallaher | Wisconsin |

**1944**

| | |
|---|---|
| George Wesley Pracy | California |
| William Storrie | Canadian |
| Frederic Arnold Eidsness | Florida |
| Levi Larndon Hedgepeth | Four States |
| Winfred Dean Gerber | Illinois |
| Edward Francis Kinney | Indiana |
| Louis Benjamin Harrison | Michigan |
| Daniel Howard Rupp | Missouri Valley |
| David Shon Thomas | Montana |
| Attmore Edwin Griffin | New Jersey |
| Ernest John Rowe | New York |
| William McKinney Piatt | North Carolina |
| Philip Burgess | Ohio |
| Fred Merryfield | Pacific Northwest |
| Dwight David Gross | Rocky Mountain |
| Fletcher King Ellis | Southeastern |
| Leslie Allerton Jackson | Southwest |
| Robert Cousins Bardwell | Virginia |
| John Needels Chester | Western Pennsylvania |
| Joseph Kerr Buchanan | West Virginia |
| Herbert Henry Brown Joseph Philip Schwada | Wisconsin |

*Deceased.

## SUMMARY OF MEMBERSHIP, AUGUST 1, 1944

| | |
|---|---|
| Honorary Members | 30 |
| Active Members | 4,545 |
| Corporate Members | 495 |
| Associate Members | 245 |
| Junior Members | 20 |
| Affiliates | 79 |
| Total | 5,414 |

The Consolidated List of Members, which begins on page 1 following, includes the members of all grades—Honorary, Active, Corporate, Associate and Junior—and also the Affiliates. The listing is correct as of August 1, 1944, including all those whose applications were received up to that date.

For separate listings of:

Honorary Members, see page *10*;
Corporate Members, see page 79;
Associate Members, see page 82.

All members are listed geographically beginning on page 85.

The date when the member first joined the Association is cited in each listing. Active Members are designated only by the date, for example, (July '39). Corporate, Associate and Junior Members and Affiliates are shown in the following manner: (Corp. M. July '39), (Assoc. M. July '39), (Jr. M. July '39) and (Affil. July '39).

Offices held by members are cited according to the years of the conventions during which the members served. Awards and Honorary Memberships are shown by the year of the convention at which they were presented. Members enrolled in one or more of the Association's three Divisions—Finance & Accounting Division, Plant Management and Operation Division and Water Purification Division—are designated by *A*, *M* and *P*, respectively.

The symbol † in the Consolidated List of Members indicates an address change received too late for geographic reclassification.

# MEMBERSHIP BY SECTIONS

*The total membership figures for each section in this table are listed directly after the section name and are in bold-face type. The breakdown of the sections by states and provinces follows the total in which it is included.*

| Section | Active and Honorary | Corp. | Assoc. | Affil. | Junior | Total |
|---|---|---|---|---|---|---|
| **California** | **565** | **50** | **32** | **1** | **1** | **649** |
| *Arizona* | *18* | — | — | — | — | *18* |
| *California* | *543* | *49* | *32* | *1* | *1* | *626* |
| *Nevada** | *4* | *1* | — | — | — | *5* |
| **Canadian** | **258** | **64** | **4** | **1** | **—** | **327** |
| *Alberta* | *10* | *1* | — | — | — | *11* |
| *British Columbia* | *12* | *3* | *1* | *1* | — | *17* |
| *Manitoba* | *9* | — | — | — | — | *9* |
| *New Brunswick* | *1* | — | — | — | — | *1* |
| *Nova Scotia* | *8* | *1* | — | — | — | *9* |
| *Ontario* | *176* | *56* | *2* | — | — | *234* |
| *Prince Edward Island* | *1* | — | — | — | — | *1* |
| *Quebec* | *35* | *2* | *1* | — | — | *38* |
| *Saskatchewan* | *6* | *1* | — | — | — | *7* |
| **Cuban** | **35** | **1** | **—** | **—** | **—** | **36** |
| **Florida** | **119** | **7** | **2** | **—** | **—** | **128** |
| **Four States** | **277** | **18** | **20** | **—** | **1** | **316** |
| *Delaware* | *7* | — | — | — | — | *7* |
| *District of Columbia* | *51* | *1* | — | — | — | *52* |
| *Maryland* | *88* | *3* | *2* | — | *1* | *94* |
| *Pennsylvania (eastern)†* | *131* | *14* | *18* | — | — | *163* |
| **Illinois** | **261** | **16** | **26** | **1** | **2** | **306** |
| **Indiana** | **165** | **20** | **9** | **6** | **2** | **202** |
| **Kentucky-Tennessee** | **114** | **11** | **4** | **1** | **1** | **131** |
| *Kentucky* | *54* | *6* | *3* | *1* | — | *64* |
| *Tennessee* | *60* | *5* | *1* | — | *1* | *67* |
| **Michigan** | **121** | **14** | **4** | **7** | **—** | **146** |
| **Minnesota** | **84** | **13** | **7** | **1** | **—** | **105** |
| *Minnesota* | *70* | *13* | *7* | *1* | — | *91* |
| *North Dakota* | *14* | — | — | — | — | *14* |
| **Missouri Valley** | **212** | **20** | **8** | **—** | **1** | **241** |
| *Iowa* | *48* | *9* | *2* | — | *1* | *60* |
| *Kansas* | *33* | *3* | — | — | — | *36* |
| *Missouri* | *106* | *4* | *5* | — | — | *115* |
| *Nebraska (eastern)‡* | *16* | *3* | *1* | — | — | *20* |
| *South Dakota* | *9* | *1* | — | — | — | *10* |
| **Montana** | **48** | **6** | **—** | **—** | **—** | **54** |

# MEMBERSHIP BY SECTIONS—*Concluded*

| *Section* | *Active and Honorary* | *Corp.* | *Assoc.* | *Affil.* | *Junior* | *Total* |
|---|---|---|---|---|---|---|
| **New England** | **136** | **10** | **17** | **—** | **2** | **165** |
| *Connecticut* | *35* | *2* | *3* | — | — | *40* |
| *Maine* | *17* | *2* | — | — | — | *19* |
| *Massachusetts* | *70* | *2* | *9* | — | *1* | *82* |
| *New Hampshire* | *2* | *1* | *1* | — | *1* | *5* |
| *Rhode Island* | *8* | *2* | *4* | — | — | *14* |
| *Vermont* | *4* | *1* | — | — | — | *5* |
| **New Jersey** | **231** | **24** | **12** | **12** | **1** | **280** |
| **New York** | **387** | **69** | **48** | **5** | **1** | **510** |
| **North Carolina** | **113** | **34** | **1** | **—** | **2** | **150** |
| **Ohio** | **235** | **4** | **17** | **4** | **1** | **261** |
| **Pacific Northwest** | **189** | **25** | **2** | **11** | **1** | **228** |
| *Idaho* | *14* | *7* | — | *1* | — | *22* |
| *Oregon* | *59* | *11* | — | *4* | — | *74* |
| *Washington* | *116* | *7* | *2* | *6* | *1* | *132* |
| **Rocky Mountain** | **74** | **15** | **1** | **1** | **—** | **91** |
| *Colorado* | *48* | *7* | — | — | — | *55* |
| *Nebraska (western)‡* | *2* | — | — | — | — | *2* |
| *New Mexico* | *6* | *6* | — | — | — | *12* |
| *Utah* | *8* | *2* | *1* | — | — | *11* |
| *Wyoming* | *10* | — | — | *1* | — | *11* |
| **Southeastern** | **200** | **10** | **5** | **4** | **1** | **220** |
| *Alabama* | *49* | *3* | *5* | *1* | — | *58* |
| *Georgia* | *93* | *4* | — | *2* | *1* | *100* |
| *Mississippi* | *13* | *1* | — | — | — | *14* |
| *South Carolina* | *45* | *2* | — | *1* | — | *48* |
| **Southwest** | **281** | **24** | **4** | **—** | **3** | **312** |
| *Arkansas* | *56* | *4* | — | — | — | *60* |
| *Louisiana* | *44* | *2* | — | — | — | *46* |
| *Oklahoma* | *33* | *1* | *1* | — | — | *35* |
| *Texas* | *148* | *17* | *3* | — | *3* | *171* |
| **Virginia** | **93** | **4** | **4** | **1** | **—** | **102** |
| **West Virginia** | **45** | **3** | **—** | **20** | **—** | **68** |
| **Western Pennsylvania** | **128** | **9** | **13** | **3** | **—** | **153** |
| **Wisconsin** | **106** | **15** | **5** | **—** | **—** | **126** |
| **Other Than U.S., Canada & Cuba** | **98** | **9** | **—** | **—** | **—** | **107** |
| **Total All Sections** | **4,575** | **495** | **245** | **79** | **20** | **5,414** |

* Nevada is not within the territory of any section. The members here enumerated are listed under the section the members have chosen individually, in accordance with the By-Laws, Art. VII, Sec. 5.

† Pennsylvania is divided between the Western Pennsylvania Section and the Four States Section, the dividing line being at longitude 77° 45′ W.

‡ Nebraska is divided between the Missouri Valley Section and the Rocky Mountain Section, the dividing line being at longitude 100° W.

| | Total |
|---|---|
| | 165 |
| | 40 |
| | 19 |
| | 82 |
| | 5 |
| | 14 |
| | 5 |
| | 280 |
| | 510 |
| | 150 |
| | 261 |
| | 228 |
| | 22 |
| | 74 |
| | 132 |
| | 91 |
| | 55 |
| | 2 |
| | 12 |
| | 11 |
| | 11 |
| | 220 |
| | 58 |
| | 100 |
| | 14 |
| | 48 |
| | 312 |
| | 60 |
| | 46 |
| | 35 |
| | 171 |
| | 102 |
| | 68 |
| | 153 |
| | 126 |
| | 107 |
| | 5,414 |

# CONSOLIDATED LIST OF MEMBERS

*Members in military service are indicated by ★. In most such cases, the member's civilian address is given. Members registered in the Finance and Accounting Division are indicated by "A"; in the Plant Management and Operation Division by "M"; and in the Water Purification Division by "P."*

**Abbott, Carroll B.,** Pres., Water Works Supply Co., 501 Howard St., San Francisco 5, Calif. (May '22)

**Abbott, Frank A.,** *see* Camden Public Works Dept.

**Abbott, G. H.,** Treas. & Supt., Southbridge Water Supply Co., Southbridge, Mass. (May '12) *AM*

**Abell, D. S.,** Chief Engr. & Director, Bureau of Sanitation, 519 Dexter Ave., Montgomery, Ala. (Nov. '32) ★

**Abell, E. B.,** Owner & Mgr., Abell Water Co., Twentynine Palms, Calif. (Apr. '42)

**Abercrombie, J. S., Co.,** Robert Burket, Sweeny, Tex. (Corp. M. Jan. '40)

**Abernathy, Gene E.,** Box 1947, Oklahoma City 1, Okla. (Jan. '44)

**Ables, Abbott J.,** Supt., Water Works, Hampton, Ark. (Oct. '43) *M*

**Abplanalp, C. C.,** Wallace & Tiernan Co., Inc., 809 W. Washington Blvd., Chicago 7, Ill. (Mar. '31) *P*

**Abraham, Chas. P.,** Supt., Bureau of Water, Municipal Bldg., Lancaster, Pa. (May '30) *M*

**Abrams, M. F.,** Wailes Dove-Hermiston Corp., 17 Battery Pl., New York 4, N.Y. (Oct. '37)

**Abrams, Norman H.,** 1014 N. 20th St., Waco, Tex. (Oct. '39) *M*

**Abt, Kenneth B.,** Filter Plant, R.D. No. 1, Middletown, N.Y. (Jan. '43)

**Acadia Synthetic Products Div.,** H. N. Vickerman, 4029 Ogden Ave., Chicago 23, Ill. (Assoc. M. Apr. '43)

**Acchione, Lawrence J.,** Partner & Civ. Engr., Acchione Contracting Co., 1607–09 McKean St., Philadelphia 45, Pa. (July '44)

**Acevedo-Quintana, F.,** Designing Engr., Apdo. 891, Caracas, Venezuela, S.A. (Jan. '41)

**Ackerman, Arthur P.,** Stockbridge Rd., Great Barrington, Mass. (Apr. '43)

**Ackerman, J. Walter,** Munnsville, Madison Co., N.Y. (Feb. '10) *Trustee '30. Director '30–'32. Honorary M. '41. M*

**Acres, H. G.,** Pres., H. G. Acres & Co., Cons. Engrs., 2135 Culp St., Niagara Falls, Ont., Can. (June '27)

**Activated Alum Corp.,** *see* Stuart-Brumley Corp.

**Adams, Clarence D.,** Water Plants Supt. & Consultant, Public Service Co. of Indiana, Box 307, New Albany, Ind. (Jan. '35) *P*

**Adams, G. P.,** Filter Plant Operator, Napoleon Water Works, 1003 Scott St., Napoleon, Ohio (Apr. '39) *P*

**Adams, Howard J.,** Supt., Northern Illinois Water Corp., 120 N. Park St., Streator, Ill. (Jan. '38)

**Adams, John M.,** 1320 Queen Anne Ave., Seattle 9, Wash. (Apr. '40) *M*

**Adams, John W.,** Supt., Water Works System, 507 E. First North St., Carlinville, Ill. (Apr. '42) *MP*

**Adams, R. R.,** Civ. Engr., J. E. Sirrine & Co., Box 960, Greenville, S.C. (Jan. '44)

**Adams, Reginald B.,** Chemist & Bacteriologist, Pennsylvania Water Co., 712 South Ave., Wilkinsburg, Pa. (June '30) *P*

**Adcock, R. W.,** Adcock Water Co., 1432 Del Monte Ave., Salinas, Calif. (Oct. '42) *A*

**Adirondack Water Works,** H. N. Haberer, Lowville, N.Y. (Corp. M. Jan. '23)

**Adkins, W. W.,** San. Engr., Water Dept., City Hall, Asheboro, N.C. (July '40) *P*

**Aeryns, Albert N.,** 716 Greenwood Ave., Brooklyn, N.Y. (Jan. '15) *P*

**Affrica, Louis,** Supt., Water Dept., 807 Horner St., Brackenridge, Pa. (Oct. '40)

**Aga, A. K.,** Jharia Water Board, Engineer's Bungalow, Dhaya, P.O. Dhanbad, Manbhum, India (Jan. '35)

**Agrimonti, A. F.,** Supt. of Utilities, Hinsdale, Ill. (Jan. '43)

**Aho, John E.,** *see* Eveleth, City of

**Ahrens, H. C.,** *see* Winona Board of Munic. Works

**Aker, Lewis P.,** Chem. Engr., Louisville Gas & Electric Co., 3909 Springhill Rd., Louisville 7, Ky. (Oct. '43) *P*

**Alameda County Water Dist.,** E. A. Richmond, Gen. Mgr., 116 S. Main St., Centerville, Calif. (Corp. M. Apr. '44)

**Alarcon, Domingo Guevara,** Ing., Calle Ignacio de la Llave No. 2, Veracruz, Ver., Mexico (Jan. '38)

**Albert, E. K.,** Chief Engr., California-Pacific Utilities Co., 400 Financial Center Bldg., San Francisco, Calif. (Apr. '42)

**Albert, J. E.,** Vice-Pres., Associated Public Utilities Corp., 17 N. High St., Columbus, Ohio (Feb. '29)

**Albert Lea Water Dept.,** C. V. Jones, City Mgr., City Hall, Albert Lea, Minn. (Corp. M. Oct. '40)

**Albion Water Dept.,** E. A. Mahoney, Village Clerk, Municipal Bldg., Albion, N.Y. (Corp. M. July '43)

**Albrecht, Robert H.,** Supt. of Public Works, Board of Water, Light & Sewer Com., Hamilton, N.Y. (Affil. Jan. '39)

**Albright, Porter,** Box 238, R.D. No. 1, Elsinore, Calif. (Oct. '38)

**Albuquerque, City of,** Chas. E. Wells, City Mgr., City Hall, Albuquerque, N.M. (Corp. M. Apr. '44)

**Alderman, Frank E.,** City Engr., City Hall, South Gate, Calif. (Oct. '39) *M*

**Aldrich, Ellwood H.,** 66 Milton Rd., Rye, N.Y. (July '35) *AMP*

**Alexander, Allen Y., Jr.,** Operator, Sewage Plant, 222 Monmouth Ave., Durham, N.C. (Oct. '42)

**Alexander, C. E.,** Bottlers' Service Dept., The Coca-Cola Co., 310 North Ave., N.W., Drawer 1734, Atlanta 1, Ga. (Jan. '42)

**Alexander, C. F.,** *see* Texas Water Co.

**Alexander, Louis J.,** Southern California Water Co., 950 Bendix Bldg., 12th & Maple Sts., Los Angeles 15, Calif. (Oct. '37)

**Alexander, R. C.,** Mgr., Water Co., Centerville, Iowa (July '20)

**Alexander, Thos.,** Supt., Water Dept., City Hall, Kelso, Wash. (May '44)

**Alexandria Water Dept.,** W. A. McLean, Comr. of Public Utilities, City Hall, Alexandria, La. (Corp. M. Jan. '43)

**Alfke, Charles J.,** Executive Vice-Pres., Hackensack Water Co., 624 Park Ave., Weehawken, N.J. (Mar. '25)

**Alizo, Antonio,** Constr. Engr., Instituto Nacional de Obras Sanitarias, Merida, Venezuela, S.A. (Oct. '43)

**Allen, Bernard,** Mgr., Blytheville Water Co., Blytheville, Ark. (Apr. '37)

**Allen, E. Jerry,** Supervisor of Sterilization, City Water Dept., 7517 Bagley Ave., Seattle 3, Wash. (Apr. '44) *MP*

**Allen, G. P.,** *see* Santa Ana Valley Irrigation Co.

**Allen, Henry A.,** Cons. Engr., 3138 Sheridan Rd., Chicago 14, Ill. (Jan. '27) *P* ★

**Allen, Hoyt E.,** Supt., Munic. Service, Wyandotte, Mich. (July '29)

**Allen, James H.,** Chief Engr., Interstate Com. on Delaware River Basin, 581 Broad St. Station Bldg., Philadelphia, Pa. (Jan. '43)

**Allen, John Bolling,** Asst. Engr., Water Div., 2001 Branch Ave., S.E., Washington, D.C. (Jan. '42) ★

**Allen, O. H.,** Supt., Water Dept., Mansfield, Ark. (Apr. '36)

**Allen, Tip H.,** *see* Canton Munic. Utilities

**Allen, Victor H.,** Mng. Editor, American Water Works Assn., 500—5th Ave., New York 18, N.Y. (Jan. '39) ★

**Allendale, Water Dept. of Boro of,** Carl T. Wehner, Chairman of Water Com., Allendale, N.J. (Corp. M. Oct. '38)

**Allentown Bureau of Water,** City Hall, Allentown, Pa. (Corp. M. May '22)

**Allied Chemical & Dye Corp.,** *see* Barrett Div.

**Allin, Claud R.,** Supt., Orange County Water Works, Dist. No. 2, Buena Park, Calif. (Sept. '41)

**Allis-Chalmers Mfg. Co.,** H. P. Binder, Mgr., Centrifugal Pump Dept., Milwaukee 1, Wis. (Assoc. M. June '05)

**Allison, Ellis J.,** City Mgr., City Hall, Salina, Kan. (July '44)

**Allouez Water Dept.,** William Van Frachem, Supt., R. No. 6, Green Bay, Wis. (Corp. M. Apr. '43)

**Alpha, Borough of,** Frank Pados, Supt., Munic. Water Works, Borough Hall, Alpha, N.J. (Corp. M. July '43)

**Alt, Edward E.,** Personnel Director, Shipbuilding Div., Chicago Bridge & Iron Co., Seneca, Ill. (Apr. '41) *P*

**Alt, E. F.,** *see* Rich Mfg. Co., Ltd.

**Alter, Amos J.,** Box 2868, Juneau, Alaska (Apr. '42)

**Altoberro, Juan Carlos,** Ing., 2029, Charrua St., Montevideo, Uruguay, S.A. (May '28)

**Aluminum Co. of Canada Ltd.,** c/o Technical Director, Arvida Works, Arvida, Que., Can. (Corp. M. Oct. '43)

**Ambridge Water Dept.,** S. L. Card, Secy., Ambridge, Pa. (Corp. M. Jan. '41)

**Ambursen Engineering Corp.,** S. W. Stewart, Secy., 295 Madison Ave., New York 17, N.Y. (Assoc. M. Jan. '21)

**American Brass Co.,** F. G. Smith, 414 Meadow St., Waterbury, Conn. (Assoc. M. Aug. '22)

**American Cast Iron Pipe Co.,** Lester Long, Box 2603, Birmingham, Ala. (Assoc. M. July '07)

**American City, The,** Edgar J. Buttenheim, 470 Fourth Ave., New York 16, N.Y. (Assoc. M. May '18)

**American Colloid Co.,** Paul Bechtner, Pres., 363 W. Superior St., Chicago 10, Ill. (Assoc. M. Apr. '38)

**American Concrete Pipe Assn.,** M. W. Loving, Cons. Engr., 33 W. Grand Ave., Chicago 10, Ill. (Assoc. M. Oct. '17)

**American Cyanamid & Chemical Corp.,** J. D. Lowery, 30 Rockefeller Plaza, New York 19, N.Y. (Assoc. M. June '06)

**American Enka Corp.,** B. W. Crutchfield, Enka, N.C. (Corp. M. Jan. '41)

**American Foundry & Mfg. Co.,** 1015 Hebert St., St. Louis 7, Mo. (Assoc. M. May '08)

**American Iron & Steel Institute,** E. H. Thwaits, Research Engr., 350 Fifth Ave., New York 1, N.Y. (Assoc. M. Jan. '41)

**American Pipe & Construction Co.,** Robert V. Edwards, Vice-Pres., Box 3428 Terminal Annex, Los Angeles 54, Calif. (Assoc. M. Oct. '41)

**American Rolling Mill Co.,** R. C. Beam, Mgr., Spiral Welded Pipe Dept., Middletown, Ohio (Assoc. M. Jan. '27)

**American Smelting & Refining Co.,** J. E. English, Asst. Mgr., Lead Products Div., 120 Broadway, New York 5, N.Y. (Assoc. M. Apr. '42)

**American Valve Mfg. Co.,** William J. White, Supt., 170 Mansion St., Coxsackie, N.Y. (Assoc. M. Oct. '43)

**American Water Softener Co., G.** S. Garrett, Treas., Lehigh Ave. & Fourth St., Philadelphia 33, Pa. (Assoc. M. July '23)

**American Water Works & Elec. Co., Inc.,** P. B. Niles, Director, Customer & Employee Relations, 50 Broad St., New York 4, N.Y. (Corp. M. June '15)

**American Well Works, Inc., The,** E. B. Rausch, Gen. Mgr., Aurora, Ill. (Assoc. M. Mar. '23)

**Ames, Burton L.,** Supt., Water Dept., 706 Pine St., Perrysburg, Ohio (Apr. '44) *M*

**Ames, J. H.,** *see* Ames Water Dept.

**Ames Water Dept.,** J. H. Ames, City Mgr., Ames, Iowa (Corp. M. Jan. '37)

**Amiss, Thomas L.,** Supt. & Engr., Water & Sewerage, Shreveport, La. (May '18) *Director '42–'45. AMP*

**Ampco Metal, Inc.,** 1745 S. 38th St., Milwaukee 4, Wis. (Assoc. M. Apr. '44)

**Amsbary, Frank C., Jr.,** Mgr., Illinois Water Service Co., Champaign, Ill. (Jan. '27) *Director '39–'42. Fuller Award '41. MP*

**Anaconda Copper Mining Co.,** Water Works Dept., H. M. Johnson, Box 548, Anaconda, Mont. (Corp. M. June '10)

**Anderson, A. E.,** *see* Moline Water Works

**Anderson, A. L.,** 300 E. Broad St., Falls Church, Va. (Nov. '25)

**Anderson, City of,** Paul C. Laux, Supt. of Water Works & City Chemist, Anderson, Ind. (Corp. M. Jan. '35) *Fuller Award '41.*

**Anderson, Clarence S.,** Supt. of Public Works, Municipality of Township of Tisdale, South Porcupine, Ont., Can. (Apr. '38)

**Anderson, E. D.,** *see* Northern Indiana Public Service Co.

**Anderson, F. R.,** Supt., Duke Power Co., Rutherfordton, N.C. (July '41) *M*

**Anderson, H. E.,** Supt., Water Dept., Municipal Bldg., Muskogee, Okla. (Oct. '39)

**Anderson, L. Harold,** City Engr., City Hall, Palo Alto, Calif. (Oct. '43) *AMP*

**Anderson, Martin E.,** Supt., Water Co., 511 E. 8th St., Leadville, Colo. (Jan. '43)

**Anderson, Milton,** 410 Ducommon St., Box 3659 Terminal Annex, Los Angeles 54, Calif. (Oct. '34)

**Anderson, Norval E.,** Engr. of Treatment Plant Design, San. Dist. of Chicago, 910 S. Michigan Ave., Chicago 5, Ill. (Oct. '41)

**Anderson, R. B.,** Asst. Civ. Engr., U.S. Naval Training Station, Apt. 53A-L.C.H., Farragut, Idaho (June '34)

**Anderson, R. V.,** Civ. Engr., Armstrong-Wood & Co., 62 Richmond St., W., Toronto, Ont., Can. (Jan. '44)

**Anderson, S. T.,** *see* Springfield City Water, Light & Power Dept.

**Andrews, Robert E.,** National Board of Fire Underwriters, 1014 Merchants Exchange Bldg., San Francisco 4, Calif. (June '13)

**Andrews, W. S.,** Dist. Mgr., Pittsburgh Equitable Meter Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. (Jan. '41) *M*

**Angle, C. F.,** Supt. of Water Purif., Tubize Chatillon Corp., Rome, Ga. (Jan. '38) *P*

**Anglim, Daniel W.,** Dist. Supt., Dept. of Public Works, 8158 Cornell Ave., Chicago, Ill. (July '42)

**Angus, Robert W.,** Prof. Emeritus of Mech. Eng., Univ. of Toronto, Toronto, Ont., Can. (Feb. '17) *Fuller Award '42. MP*

**Anheuser-Busch, Inc.,** Bottling Plant Stores Lab., 619 Arsenal St., St. Louis 18, Mo. (Corp. M. Apr. '38)

**Ann Arbor Water Dept.,** H. H. Caswell, Mgr., 218 E. Huron St., Ann Arbor, Mich. (Corp. M. Apr. '19)

**Anthony, Sidney S.,** Augusta Water Dist., Augusta, Me. (Apr. '36) *M*

**Antweiler, John J.,** Engr. of Distr., Cleveland Div. of Water, 9013 Empire Ave., Cleveland 8, Ohio (June '27)

**Apgar, Paul N.,** Supt. of Mains & Services, Water Dept., City Hall, East Orange, N.J. (Affil. Oct. '38)

**Applebaum, Samuel B.,** Vice-Pres., The Permutit Co., 330 W. 42nd St., New York 18, N.Y. (Apr. '16) *P*

**Applegate, George,** Power House Foreman, Refinery Div., Sun Oil Co., Box 920, Woodville St., Toledo, Ohio (Oct. '39)

**Arbour, E.,** Mgr., Tecumseh Public Utilities Com., 112 Tecumseh Rd., W., Tecumseh, Ont., Can. (Apr. '42) *M*

**Archbell, Clarence,** Supt., Water & Sewer, 300 E. Meredith St., Marshall, Tex. (Oct. '43) *M*

**Archer, Elmer T.,** E. T. Archer & Co., 114 W. 10th St., Kansas City 6, Mo. (May '18)

**Archer, Herb F.,** Utility Officer, City Water Dept., City Hall, Olathe, Kan. (July '44)

**Arenander, Carl A.,** Asst. Engr. with Malcolm Pirnie, 25 W. 43rd St., New York 18, N.Y. (Oct. '35) *MP*

**Argentina, Obras Sanitarias de la Nacion,** Charcas 1840, Buenos Aires, Argentina, S.A. (Corp. M. Jan. '26)

**Argo, John Wilkie,** Gore & Storrie, Cons. Engrs., 1130 Bay St., Toronto, Ont., Can. (Apr. '44)

**Armitage, John A.,** Supt., Water & Sewer Dept., Carbide & Carbon Chemical Corp., Box P, Oak Ridge, Tenn. (Apr. '44) *MP*

**Armstrong, C. G. R.,** Cons. Engr., 605–6 Bartlet Bldg., Windsor, Ont., Can. (May '34) *P*

**Armstrong, Charles L.,** Repr., Dearborn Chemical Co., 305 W. Earl St., Greenville, S.C. (Jan. '41)

**Armstrong, E. M.,** Supt., Water Dept., 712 Washington St., Vancouver, Wash. (Apr. '43) *A*

**Armstrong, James W.,** 2722 Second Ave., Bradenton, Fla. (Mar. '10) *Fuller Award '39. P*

**Armstrong, K. C.,** Chester Munic. Authority, Water Service, Fifth & Welsh Sts., Chester, Pa. (Dec. '24) *MP*

**Armstrong, Paul S.,** Engr., Fraser Brace Engineering Co., Inc., 10 E. 40th St., New York 17, N.Y. (Oct. '43)

**Armstrong, Roger W.,** Board of Water Supply, 120 Wall St., New York 5, N.Y. (Apr. '16)

**Arno, Rollo,** Bacteriologist, Mt. Prospect Lab., 355 Park Pl., Brooklyn, 17, N.Y. (July '41) *P*

**Arnold, Gerald E.,** San. Engr., 477 Colon Ave., San Francisco, Calif. (Sept. '33) *Fuller Award '39.*

**Arnold, L. E.,** Pres. & Mgr., Water Works Equipment Co., 151 W. Second South St., Salt Lake City 1, Utah (Oct. '39)

**Arnold, William L.,** Auditor, California Water & Telephone Co., 2130 Huntington Drive, San Marino 9, Calif. (July '33) *A*

**Art Concrete Works,** Frank M. Brooks, Box 417, Pasadena, Cafil. (Assoc. M. Dec. '20)

**Arteaga, Luis,** Civ. Engr., Anatole France 10, Chapultepec, Polanco, Mexico (July '44)

**Ashcraft, Chas. A.,** Supt., Water Dept., 211 S. Clark St., Pana, Ill. (Oct. '41)

**Ashe, F. H.,** City Chemist, 3674 S.W. 16th Terrace, Miami, Fla. (July '43)

**Asheville, City of,** Thad C. Burnett, Supt. of Watersheds, City Hall, Asheville, N.C. (Corp. M. Jan. '43)

**Ashford, F. J.,** City Clerk, Box 1040, Swift Current, Sask., Can. (Jan. '37)

**Ashland Water Dept.,** Ashland, Ore. (Corp. M. Apr. '40)

**Ashley, Fred M.,** Comr. of Public Works, City Hall, Fresno 1, Calif. (Jan. '42)

**Ashline, Robert R.,** Electrolysis Engr., Bureau of Water Works & Supply, 510 E. 2nd St., Los Angeles, Calif. (Oct. '35) *MP* ★

**Astoria, City of,** H. M. McCallister, Supt. of Public Works, City Hall, Astoria, Ore. (Corp. M. Apr. '44)

**Asunsolo, Raul Castro,** Pres., Cardenas City Water Works Co., Calle Nueve No. 12, E., Cardenas, Cuba (Oct. '41)

**Atkinson, Asher,** Engr., Water Dept., 49 Mine St., New Brunswick, N.J. (Mar. '22) *P*

**Atkinson, George E.,** 4851 N. 16th St., Arlington, Va. (Jan. '35) *AM*

**Atkinson, Roswell C.,** *see* Newnan Water & Light Com.

**Atlas Carbon & Clay Corp.,** Paul Dickerson, Chief Chemist, Box 700, Glendale 4, Calif. (Assoc. M. Oct. '43)

**Atlas Mineral Products Co. of Pa.,** Geo. L. Wirtz, Pres., Mertztown, Pa. (Assoc. M. May '26)

**Attersall, Charles F.,** Supt., Water Works, Winchester, Ky. (June '10)

**Auburn Water Dept.,** John E. Stapleton, Memorial City Hall, Auburn, N.Y. (Corp. M. Mar. '11)

**Aultman, William W.,** Water Purif. Engr., Metropolitan Water Dist. of Southern California, Box 38, La Verne, Calif. (Jan. '36) ★

**Aupry, Alfred,** *see* Rouses Point, Village of

**Aurora Water & Light Com.,** Charles Juhlin, Supt., Aurora, Minn. (Corp. M. Jan. '40)

**Austin Board of Water, Elec., Gas & Power Comrs.,** H. J. Lamon, Supt., 419 E. Water St., Austin, Minn. (Corp. M. July '35)

**Austin H. B.,** Austin Engineering Co., 115 S. Jefferson St., Peoria, Ill. (Jan. '41)

**Austin, James L.,** *see* Pittsburgh Equitable Meter Co.

**Austin, Ralph D.,** City Engr. & Water Supt., City Hall, Little Falls, N.Y. (Apr. '38) *M*

**Austin, Robert William,** Hydr. Engr., New York State Public Service Com., Albany 1, N.Y. (Jan. '41) ★

**Averett, C. P.,** Gen. Mgr., Water Well Equipment Co., 3865 Grandview Blvd., Mar Vista, Calif. (Apr. '44)

**Avrett, W. L., Jr.,** 886 Wildwood Rd., N.E., Atlanta, Ga. (Apr. '36) ★

**Axelrad, B. A.,** Tech. Asst. to Gen. Supt., Freeport Sulphur Co., Freeport, Tex. (Apr. '39) *P*

**Ayala H., Juan Pablo,** Design Engr., Ministerio de Obras Publicas, Div. de Analisis de Aguas, Caracas, Venezuela, S.A. (Jan. '41)

**Ayliffe, Ora C.,** Supt. of Water Works, 1429—7th St., S., Fargo, N.D. (July '37) *M*

**Ayres, Louis E.,** Civ. Engr., Ayres, Lewis, Norris & May, 506 Wolverine Bldg., Ann Arbor, Mich. (Nov. '16)

**Azpurua Q., Pedro P.,** Civ. Engr., Direccion de Obras Hidraulicas y Sanitarias, Este 8, No. 123, Caracas, Venezuela, S.A. (July '42)

**Baals, Harry W.,** Mayor, City Hall, Fort Wayne, Ind. (Jan. '35)

**Babbit, C. D.,** Supt., Water Works, Box 143, Natchez, Miss. (Jan. '44)

**Babbitt, Harold E.,** Prof. of San. Eng., Univ. of Illinois, 204 Engineering Hall, Urbana, Ill. (June '16) *Director '36–'39. P*

**Babcock & Wilcox Co., The,** J. B. Romer, Barberton, Ohio (Assoc. M. May '24)

**Babcock, Glenn E.,** Supt., Water Dept., Mentor Village Hall, Mentor, Ohio (July '44) *M*

**Bach, Clayton M.,** Jr. Chemist & Water Bacteriologist, Fridley Softening Plant, 43rd & Marshall Sts., N.E., Minneapolis 13, Minn. (July '42) *P* ★

**Bacharach, E. W.,** *see* Bacharach, E. W., & Co.

**Bacharach, E. W., & Co.,** E. W. Bacharach, Pres., 800 Rialto Bldg., Kansas City 6, Mo. (Assoc. M. Apr. '40)

**Bachelder, Herbert W.,** Engr. in Charge, Munic. Com., Herkimer, N.Y. (Oct. '40)

**Bachmann, Frank,** San. Eng. Div., The Dorr Co., 570 Lexington Ave., New York 22, N.Y. (Feb. '15) *P*

**Bacon, Harold R.,** *see* Birmingham Water Co.

**Bacon, Vinton W.,** 1223 Flood Bldg., San Francisco 2, Calif. (Jan. '41) ★

**Bader, John,** Supt., San Gabriel Valley Water Service, 1148 E. Elliott St., El Monte, Calif. (Oct. '43)

**Badger, H. F.,** Secy., Board of Fire Underwriters of the Pacific, 914 Merchants Exchange Bldg., San Francisco 4, Calif. (Aug. '25)

**Badger Meter Mfg. Co.,** 2357 N. 30th St., Milwaukee 10, Wis. (Assoc. M. June '04)

**Badley, H. W.,** Repr., Neptune Meter Co., 640 Highland St., Salina, Kan. (May '28) *M*

**Baer, Arlie,** Supt., Munic. Water Dept., 3rd St., Lawrenceburg, Ind. (Jan. '43)

**Baffa, John J.,** Hydr. & San. Engr., 142 Maiden Lane, New York 7, N.Y. (Jan. '44) *P*

**Baggarly, J. B., Jr.,** Shop Foreman, Board of Water Comrs., 417 Adams St., Macon, Ga. (Apr. '41) ★

**Bahia Servicos de Aguas e Esgotos,** Cidade do Salvador, Bahia, Brazil, S.A. (Corp. M. Apr. '43)

**Bailey, Albion A.,** Filtration Engr., Bureau of Water Supply, Montebello Filters, Baltimore 12, Md. (July '42) *P*

**Bailey, Allen C.,** Building 23, Kodak Park, Rochester 4, N.Y. (July '42) *MP* †

**Bailey, James G.,** Pres., James G. Bailey Co., Worthington, Ind. (Jan. '40)

**Bair, M. Z.,** MacCrea-Bair-Lefever, Engrs., 303 Gazette Bldg., Little Rock, Ark. (July '42) *P*

**Baity, H. G.,** Prof. of San. Eng., Univ. of North Carolina, Chapel Hill, N.C. (May '23) *Fuller Award '40. P*

**Bakeman, Melvin G.,** Head Operating Engr., Star Route, Arroyo Grande, Calif. (Jan. '44) *MP*

**Baker, Alden K.,** Mgr., Harrisburg Ice & Water Co., Harrisburg, Ark. (Apr. '43) *M*

**Baker, Arthur,** *see* La Porte Water Works

**Baker, C. V.,** *see* Electric Chemical Co.

**Baker, Chester L.,** Vice-Pres., Philadelphia Quartz Co., 121 S. Third St., Philadelphia, Pa. (Jan. '39) *M*

**Baker Dept. of Water, Fire & Sanitation,** W. P. Smith, Comr., City Hall, Baker, Ore. (Corp. M. Jan. '39)

**Baker, Frank A.,** Supt., Water Dept., City Hall, New Brunswick, N.J. (Oct. '41)

**Baker, G. H.,** *see* North York, Township of

**Baker, H. L., Jr.,** Magnolia Petroleum Co., Box 4008, Dallas, Tex. (Jan. '39) ★

**Baker, Harold J.,** *see* Fishers Island Farms, Inc.

**Baker, Harold W.,** Comdr., U.S.N.R., Bureau of Yards & Docks, 625 S. Highland St., Arlington, Va. (Jan. '43) ★

**Baker, Hoyt,** Supt., Munic. Water Dept., Hartwell, Ga. (Jan. 44) *P*

**Baker, M. N.,** 53 Oakwood Ave., Upper Montclair, N.J. (June '03) *Honorary M. '36. P*

**Baker, Michael, Jr.,** Civ. Engr., The Baker Engrs., 115 Shields St., Rochester, Pa. (July '43) *AMP*

**Baker, Michael D.,** Chief Chemist, West Penn Power Co., Springdale Power Station, Springdale, Pa. (July '41) *MP*

**Baker, R. H.,** *see* Baker, R. H., Co., Inc.

**Baker, R. H., Co., Inc.,** R. H. Baker, Pres., 2070 E. Slauson Ave., Huntington Park, Calif. (Assoc. M. Oct. '39)

**Baker, Richard A.,** Acting Foreman, City Water Dept., 711 Broadwater Ave., Billings, Mont. (Apr. '44)

**Bakewell, D. M.,** Mgr. & Secy., Santa Fe Irrigation Dist., Rancho Santa Fe, Calif. (July '39)

**Bakke, O. M.,** Chemist, Houston Labs., Box 132, Houston, Tex. (Oct. '39) *P*

**Balch, Robert T.,** Dist. Supt., Southern California Water Co., 269 W. 2nd St., Claremont, Calif. (July '43) *M*

**Baldwin, Boone,** City Mgr., Water & Light Dept., Paris, Ky. (July '42)

**Baldwin, F. O.,** Chief Chemist, Water Purif. Plant, Westover Hills, Richmond, Va. (May '22)

**Baldwin, Frank N.,** *see* Houston Water Dept.

**Baldwin, L. A.,** Vice-Pres., Johns-Mansville Sales Corp., 22 E. 40th St., New York 17, N.Y. (Apr. '39) *M*

**Baldwin Park County Water Dist.,** L. R. Cochran, Mgr., 173 E. Ramona Blvd., Baldwin Park, Calif. (Corp. M. July '43)

**Baldwin, Robert Lee,** Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City 2, Mo. (Nov. '25)

**Baldwin, Robert T.,** Secy., The Chlorine Institute, Inc., 50 E. 41st St., New York 17, N.Y. (July '24)

**Baldwin, T. H.,** City Engr., Cheyenne, Wyo. (May '34)

**Ball, Edward,** Supt., Munic. Water Works, Bracebridge, Ont., Can. (Jan. '36)

**Ball, O. V.,** Sr. San. Engr., Ontario Dept. of Health, 807 Richmond St., W., Toronto 3, Ont., Can. (Jan. '43) *P*

**Ballou, Arthur Francis,** Engr., Annapolis Hotel, Washington 5, D.C. (Aug. '24) *M*

**Ballston Spa Water Dept.,** E. R. Donohue, Supt., Box 177, Ballston Spa, N.Y. (Corp. M. July '39)

**Balshaw, Frank E.,** Water Works Engr., Calgary Power Co., Ltd., Camrose, Alta., Can. (Jan. '44)

**Bamford, J. H.,** Supt., Water Dept., Dayton, Wash. (Jan. '37)

**Banco Nacional Hipotecario Urbano y de Obras Publicas, S.A.,** *see* Mexico

**Bandy, W. A.,** 2905 Bonnie Rd., Austin 21, Tex. (July '44)

**Banks, Harvey O.,** 1628 N. Roosevelt Ave., Pasadena 7, Calif. (Jan. '41) ★

**Banks, Russell S.,** Local Mgr., Ohio Water Service Co., Marysville, Ohio (Apr. '39) *P*

**Banks, William G.,** Div. Engr., Div. of Water, Newark 2, N.J. (Dec. '19) *Fuller Award '39.*

**Bankson, Ellis E.,** The Chester Engrs., 6562 Bartlett St., Pittsburgh 17, Pa. (July '22) *AM*

**Banta, A. Perry,** Corps of Engrs., 159 Sierra View Rd., Pasadena 2, Calif. (Oct. '38) *MP* ★

**Banta, James J.,** *see* Covington, City of

**Barada & Page, Inc.,** W. M. Betts, Guinotte & Michigan Aves., Kansas City 1, Mo. (Assoc. M. Oct. '39)

**Barager, C. A.,** Supt., City Water Dept., Granite Falls, Minn. (July '40)

**Barbee, Edwin W.,** Water Purif. Engr., 1918 Carmelita Drive, San Carlos, Calif. (Jan. '36) ★

**Barbehenn, Ralph L.,** Section Chief, Transite Pipe Div., Johns-Manville Research Lab., Manville, N.J. (Apr. '43) *MP*

**Barber, B. P.,** Box 1116, Columbia 6, S.C. (Apr. '40) ★

**Barber, Norton,** Treas. & Mgr., Arlington Water Co., 469 Main St., Bennington, Vt. (Oct. '42) *AM*

**Barber, W. J.,** Asst. Gen. Mgr., Metropolitan Utilities Dist., Omaha 2, Neb. (Jan. '38) *M*

**Barbour, Frank A.,** Hydr. & San. Engr., 1120 Tremont Bldg., Boston 8, Mass. (May '06) *Director '32–'35, '36–'37. President '36. Honorary M. '39.*

**Barclay, H. T.,** *see* Mason City Water Dept.

**Barclay, Joseph L.,** Hydrographer, Bureau of Water Works & Supply, 2411 S. Curson Ave., Los Angeles, Calif. (Jan. '41) ★

**Bardwell, C. M.,** 2201 Fairfax St., Denver 7, Colo. (July '26) *P*

**Bardwell, R. A.,** Service Engr.-Water Chemist, 208 E. Conron Ave., Danville, Ill. (Jan. '38) *P*

**Bardwell, R. C.,** Supt., Water Supply, Chesapeake & Ohio Ry. Co., Richmond 10, Va. (Nov. '14) *Director '40–'43. Fuller Award '44. MP*

**Barker, J. R.,** Pacific Coast Mgr., Neptune Meter Co., 320 Market St., San Francisco 11, Calif. (June '26)

**Barker, Stanley T.,** Comdr., CEC-U.S.N.R., 2428 Navy Bldg., Washington, D.C. (Jan. '40) ★

**Barklage, O. F.,** Mfr.'s Repr., 423 S. 38th Ave., Omaha 3, Neb. (Jan. '41) *P*

**Barksdale, John C.,** Western Sales Mgr., Lynchburg Foundry Co., 1316 Peoples Gas Bldg., Chicago 3, Ill. (Jan. '39)

**Barnard, Russell E.,** Advisory Engr., Spiral Welded Pipe Dept., American Rolling Mill Co., Middletown, Ohio (Oct. '39)

**Barnes, George E.,** Prof. of Hydr. & San. Eng. & Head, Dept. of Civ. Eng. & Eng. Mechanics, Case School of Applied Science, Cleveland 6, Ohio (Jan. '36) *P*

**Barnes, James E.,** Supt., East Cleveland Water Dept., 14340 Euclid Ave., East Cleveland 12, Ohio (Jan. '41) *M*

**Barnes, W. E.,** City Engr. & Supt. of Water Works, City Hall, Liberty, Mo. (Apr. '40)

**Barnett, Gabriel,** 1995 Strauss St., Brooklyn, N.Y. (Jan. '42)

**Barnhill, Kenneth G.,** 547 Riverside Drive, New York, N.Y. (July '39)

**Barr, Carl F.,** *see* Two Harbors, City of

**Barr, J. J.,** Vice-Pres., Water Utilities Service Corp., 21 West St., New York 6, N.Y. (Jan. '44)

**Barrett Div., The,** Allied Chemical & Dye Corp., George B. McComb, 40 Rector St., New York 6, N.Y. (Assoc. M. Jan. '37)

**Barrett, E. D.,** Contracting Engr., Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill. (Apr. '44)

**Barrick, M. J.,** Dist. Engr., State Dept. of Health, 724 First Ave., Williamsport 4, Pa. (Feb. '24) *P*

**Barrie Public Utilities Com.,** George F. Smith, Supt., Water Dept., Box 334, Barrie, Ont., Can. (Corp. M. July '35)

**Barron, A. F.,** Dist. Mgr., Simplex Valve & Meter Co. & Dayton-Dowd Co., 59 E. Van Buren St., Chicago 5, Ill. (Sept. '28) *P*

**Barron, J. L.,** *see* Nassau County Dept. of Health

**Barrows, G. E.,** Technician, Dairymen's League Co-op. Assn., Inc., 810 Burnet Ave., Syracuse 1, N.Y. (Jan. '43)

**Barrows, R. J.,** Antilla Sugar Estates, Centrales Baguanos, Cueto, Oriente, Cuba (Jan. '43) *P*

**Barry, Chas.,** Salesman, Badger Meter Mfg. Co., 811 E. Noble St., Guthrie, Okla. (July '44)

**Barry, R. D.,** Mgr., Jackson County Public Water Supply Dist. No. 1, Hickman Mills, Mo. (Apr. '44) *M*

**Barstow, Eugene D.,** San. Engr., 31 N. Summit St., Akron 8, Ohio (Jan. '36) *P*

**Barth, John H.,** City Engr., La Crosse Water Dept., City Hall, La Crosse, Wis. (Oct. '41)

**Bartlett, Terrell,** The Terrell Bartlett Engrs., 2700 Transit Tower, San Antonio 5, Tex. (June '23)

**Barton, Roland,** Student, Case School of Applied Science, 2973 Essex Rd., Cleveland Heights, Ohio (Jr. M. Jan. '41) ★

**Barton, Russell,** Chairman, Water Works, Fort Erie, Ont., Can. (Apr. '42) *M*

**Bartow, Edward,** Chemistry Bldg., Iowa State Univ., Iowa City, Iowa (June '06) *Trustee '14, '15. Vice-Pres. '21. President '22. Exec. Com. '23, '24. Honorary M. '36. P* ★

**Bartuska, James F.,** Supt., Water Dept., 1642—119th St., Whiting, Ind. (Oct. '24) *MP*

**Bartz, Erwin A.,** San. Engr., Filter & Sewage Disposal Plant, 2806 West St., Two Rivers, Wis. (July '44) *P*

**Bascom, Carleton V.,** Engr., Los Angeles Dept. of Water & Power, Van Nuys, Calif. (Oct. '41) *M*

**Basom, G. E.,** Mgr., Water & Light Com., Fairmont, Minn. (June '27) *P*

**Bassett, Carroll P.,** Civ. Engr., Summit, N.J. (Oct. '09)

**Bassett, Charles K.,** Secy., Buffalo Meter Co., 2917 Main St., Buffalo 14, N.Y. (June '21)

**Bassett, Geo. B.,** Civ. Engr., 691 W. Ferry St., Buffalo 9, N.Y. (Apr. '09)

**Batavia, City of,** Floyd A. Emery, Supt. of Water, City Hall, Box 358, Batavia, N.Y. (Corp. M. Apr. '37)

**Bates, Francis,** *see* Vernon, City of

**Bates, R. W.,** Water Bureau Supervisor, Public Service Dept., 174 W. Magnolia Blvd., Burbank, Calif. (Oct. '37) *MP*

**Bates, Ralph D.,** State Dept. of Health, 65 Court St., Buffalo 2, N.Y. (Feb. '21) *P*

**Baton, Warren U. C.,** Chief Analyst, 528 S. Lang Ave., Pittsburgh 8, Pa. (Apr. '09) *P*

**Baty, James B.,** 1818 H St., N.W., Washington 25, D.C. (Apr. '37) *P* ★

**Bauer, J. Harold,** Passed Asst. Engr. (R), U.S. Public Health Service, 704 Cooledge Ave., N.E., Atlanta, Ga. (Jan. '44) *P*

**Bauer, L. G.,** 1327—8th Ave., San Francisco 22, Calif. (Mar. '31)

**Baum, W. S.,** Assoc. Engr., Burns & McDonnell Eng. Co., 107 W. Linwood Blvd., Kansas City 2, Mo. (July '44)

**Bauman, Bernard H.,** Chemist-Asst. Water Works Supt., Anheuser-Busch, Inc., 721 Pestolozzi St., St. Louis 18, Mo. (Apr. '44) *P*

**Bauman, James A.,** Director, Ridgewood Analytical Lab., Ridgewood, N.J. (Aug. '28) *P*

**Baumann, Hugo B.,** Supt. of Filtration Plant, 1017 Clinton Ave., St. Clair, Mich. (Oct. '38)

**Baumgartner, William H.,** Treatment Service Repr., E. I. du Pont de Nemours & Co., Grasselli Chemicals Dept., Wilmington 98, Del. (Jan. '36) *P*

**Bavone, A. L.,** Dist. San. Engr., Burke-Ward-McLean Health Dept., Minot, N.D. (July '43) *MP*

**Baylis, John R.,** Physical Chemist, Bureau of Eng., 1643 E. 86th St., Chicago, Ill. (Oct. '15) *Goodell Prize '32. Fuller Award '39.*

**Baylor, Chas. L.,** Village Engr., Village Water Dept., 1041 Burlington St., Downers Grove, Ill. (Oct. '42) *M*

**Bayonne, City of, Water Dept.,** J. Leonard Lindner, Supt., Bayonne Water Dept., Gate House, Belleville Turnpike, Arlington, N.J. (Corp. M. Apr. '41)

**Bays, Carl A.,** Geologist & Engr., State Geological Survey, Urbana, Ill. (Apr. '43)

**Beacham, J. G.,** City Engr. & Supt. of Water Works, Athens, Ga. (Dec. '30)

**Beadle, W. N.,** *see* Byron Jackson Co.

**Beall, R. R.,** Engr., Colcord Coal Co., Montcoal, W.Va. (Affil. Oct. '42) *P*

**Beam, R. C.,** *see* American Rolling Mill Co.

**Bean, Elwood L.,** 3036 Teesdale St., Philadelphia 15, Pa. (Apr. '28) *P*

**Bean, George,** *see* Escanaba Munic. Utilities

**Bear, Ernest J.,** *see* Livingston Water Dept.

**Beard, Kennan H.,** Mgr., Del Este Water Co., 726 Tenth St., Modesto, Calif. (Jan. '39) *M*

**Beard, R. C.,** Supt. of Constr. & Maint., Arlington Co. Water Dept., Box 204, Rosslyn Station, Arlington, Va. (Oct. '43)

**Beasley, T. E.,** Supt., Water Dept., Red Bay, Ala. (Apr. '43)

**Beatty, C. D.,** *see* Mount Holly Munic. Water Dept.

**Beatty, E. Earl,** 8186 Livernois Ave., Detroit 4, Mich. (Jan. '38)

**Beatty, Roy L.,** Mgr., Glasgow Water Dept., Glasgow, Ky. (Jan. '40)

**Beaumont, H. D.,** Supt. of Utilities, Hearne, Tex. (Jan. '44) *M*

**Beaumont Irrigation Dist.,** U. S. Murphy, Supt., Beaumont, Calif. (Corp M. Jan. '43)

**Beaver Dam Munic. Water Dept.,** Oscar Bedker, Supt., 154 Prospect Ave., Beaver Dam, Wis. (Corp. M. Jan. '41)

**Beavin, B. Everett,** Assoc., J. E. Greiner Co., 1201 St. Paul St., Baltimore 2, Md. (Jan. '35) *P*

**Bechert, C. H.,** *see* Indiana Dept. of Conservation

**Bechtner, Paul,** *see* American Colloid Co.

**Beck, A. N.,** Asst. San. Engr., Bureau of Sanitation, State Dept. of Public Health, Montgomery 4, Ala. (Apr. '38)

**Becker, Charles H.,** Mgr., Hydrant & Valve Dept., R. D. Wood Co., 400 Chestnut St., Philadelphia 5, Pa. (Aug. '27) *Director '36–'39, '44–'47.*

**Becker, Morris,** Asst. Civ. Engr., Dept. of Water Supply, Gas & Electricity, 2400 Municipal Bldg., New York 7, N.Y. (Oct. '43) *MP*

**Becker, William H.,** Neptune Equipment Co., 304 E. 8th St., Cincinnati 2, Ohio (Apr. '41)

**Beckett, Humphrey,** Supt., District of Columbia Water Dept., Washington, D.C. (Apr. '41) *M*

**Beckett, R. C.,** State San. Engr., Dover, Del. (Sept. '24) *P*

**Beckman, Leroy J.,** Field Engr., Wallace & Tiernan Co., Inc., 809 W. Washington Blvd., Chicago 7, Ill. (Apr. '43)

**Beckwith, Homer E.,** Dist. Mgr., The Pitometer Co., 429 Penn Ave., Pittsburgh 22, Pa. (Apr. '29)

**Bedker, Oscar,** *see* Beaver Dam Munic. Water Dept.

**Beenfeldt, Norman,** Div. Engr., California Water & Telephone Co., 439 Tyler St., Monterey, Calif. (Jan. '44)

**Beeny, Raymond,** Secy.-Treas., Alabama Gas Co., Watts Bldg., Birmingham 1, Ala. (Oct. '31)

**Beerman, Paul,** Engr., Civic Center, San Diego 1, Calif. (Oct. '38) *M*

**Beers, W. D.,** City Engr., Salt Lake City Corp., Salt Lake City 1, Utah (July '44)

**Behlmer, Harold H.,** Engr. & Asst. Supt. of Water Works, Water Dept., 1333—11th Ave., S., Fargo, N.D. (Jan. '44) *MP*

**Behrendt, Barclay F.,** Asst. Prof. of Civ. Eng., Oklahoma A. & M. College, Stillwater, Okla. (Oct. '42)

**Behrman, A. S.,** Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill. (Feb. '25) ★

**Beiswanger, G. J.,** Cashier, City Water Dept., Box 958, Billings, Mont. (Jan. '40) *A*

**Belanger, Raphael,** City Engr., Valleyfield, Que., Can. (Jan. '34)

**Belcher, Donald M.,** *see* Chapman Valve Mfg. Co.

**Bell, Edward A.,** 307 Roseland Ave., Essex Fells, N.J. (July '37) ★

**Bell, Grant S.,** Assoc., Howard K. Bell, Cons. Engrs., 553 S. Limestone St., Lexington 17, Ky. (Oct. '39) *P* ★

**Bell, Willard J.,** Engr., Wallace & Tiernan Co., Inc., 416 Flour Exchange Bldg., Minneapolis 15, Minn. (May '30) *P*

**Belleville Public Utilities Com.,** Oswald H. Scott, Gen. Mgr., 277 Front St., Belleville, Ont., Can. (Corp. M. Apr. '34)

**Belli, Condido,** Supt. of Public Works, Saddle River Township Water Dept., 236—5th St., Rochelle Park, N.J. (Apr. '43) *A*

**Bellingham Water Dept.,** A. B. Culmer, Supt., Bellingham 21, Wash. (Corp. M. Jan. '40) *M*

**Beltz, John H.,** Bell & Beltz, Chemists, 3340 N. Broad St., Philadelphia 40, Pa. (Jan. '36) *P*

**Belyea, John F.,** Pres., Gordon & Belyea, Ltd., 101 Powell St., Vancouver, B.C., Can. (Mar. '34)

**Bement, Harry B.,** Supt., Water Dept., Pumping Station, 14th & East End Ave., Chicago Heights, Ill. (July '43)

**Bemuel, Nickolas, Jr.,** Supt., Water Dept., City Hall, Tell City, Ind. (Jan. '44)

**Benas, Benjamin,** Supt., Richmond-Sunset Sewage Treatment Plant, 4545 Lincoln Way, San Francisco, Calif. (Oct. '34) *MP* ★

**Bender, Eug. J.,** Board Member, East Jefferson Water Works No. 1, 661 Central Ave., R.R.D. No. 2, New Orleans 20, La. (Oct. '42)

**Benedict, A. H.,** Engr., Asphalt Institute, 523 W. 6th St., Los Angeles 14, Calif. (Oct. '43)

**Benedict, Earl N.,** Purif. Supt., Water Dept., Wichita Falls, Tex. (Oct. '39) *MP*

**Benedict, Sydney J.,** Asst. Engr., Bureau of Water, 209 City Hall, Portland 4, Ore. (Dec. '28) *M*

**Benjamin, Roselle G.,** Supt., Riverhead Water Dist., 220 Roanoke Ave., Riverhead, N.Y. (July '35) *AM*

**Bennett, Boyd A.,** Pres., Water Utilities Service Corp., 21 West St., New York 6, N.Y. (Jan. '37)

**Bennett, J. H.,** Mgr., City Water Dept., San Clemente, Calif. (Oct. '41)

**Bennett, Richard,** City Engr., 80 W. Willetta St., Phoenix, Ariz. (Apr. '29)

**Bennett, S. B.,** *see* Wallaceburg Water Com.

**Bennett, Schuyler M.,** Water Treatment Plant Operator, Bureau of Water Works & Supply, 3004 Petite Court, Los Angeles, Calif. (Oct. '32)

**Bennett, Walter H.,** *see* Owosso Water Dept.

**Benson, R. T.,** Field Engr., Fairbanks Morse Co., 1226—1st Ave., S., Seattle 4, Wash. (Apr. '44)

**Bentley, Ralph E.,** Secy.-Treas., Passaic Valley Water Com., 137 Ellison St., Paterson 1, N.J. (Apr. '43) *A*

**Bequer y Herrera, Gustavo A.,** San. Engr., Calle 19 No. 711, Entre Paseo y a, Vedado, Havana, Cuba (July '38)

**Bergnes, Luis F.,** Mgr., Caibarien-Remedios Water Works Co., Box 104, Caibarien, Cuba (Oct. '41)

**Berk, Ralph G.,** Hydr. Engr., Cons. Engrs., Apdo. 168, Caracas, Venezuela, S.A. (July '41)

**Berkeley, Winston H.,** Plant Supt., 1002—13th Ave., Lewiston, Idaho (Jan. '39) *MP*

**Berkey, Fred L.,** Supt., Water Dept., Tillamook, Ore. (Mar. '31)

**Berlin Water Co.,** Phil. A. Shaffer, Mgr., 615 Main St., Berlin, Pa. (Corp. M. July '42)

**Berliner, Samuel W.,** Assoc. Civ. Engr., Dept. of Water & Power, 410 Ducommun St., Los Angeles 36, Calif. (Oct. '43)

**Bernhagen, Lewis O.,** Director of Sanitation, City Hall, Beaumont, Tex. (Mar. '17) *P*

**Bernhardt, Carl J.,** Dist. San. Engr., State Dept. of Health, 601 Hotel Jamestown Bldg., Jamestown 53, N.Y. (Apr. '39) *P*

**Berning, John,** Supt., Water Dept., Redmond, Ore. (Apr. '43) *M*

**Bernstein, Louis S.,** *see* Buffalo Niagara Elec. Corp.

**Berry, Albert E.,** Director, San. Eng. Div., Ontario Dept. of Health, 235 Gainsborough Rd., Toronto 8, Ont., Can. (June '20) *Fuller Award '39. Director '37–'40. MP*

**Berry, Clifton W.,** *see* Elwood Water Works & Sewage Plant

**Berry, C. Radford,** 1215 N. Second St., Harrisburg, Pa. (June '34) ★

**Berry, F. R.,** Engr., American Water Works & Elec. Co., 50 Broad St., New York 4, N.Y. (Apr. '23)

**Berry, Garmon H.,** Plant Supervisor, Camp Davis, N.C., Box 665, Holly Ridge, N.C. (July '43) *P*

**Berry, Henry,** Chairman, Metropolitan Water Board, New River Head, Rosebery Ave., London, E.C. 1, England (July '44)

**Berry, Richard B.,** Designer, Dept. of Public Works, 401 City Hall, Chicago 2, Ill. (Jan. '42) *P*

**Besozzi, Leo,** 314 Hammond Bldg., Hammond, Ind. (May '34)

**Besterman, J. S.,** *see* Sewickley Comrs. of Water Works

**Bethlehem, City of,** Ario Wear, Director of Parks & Public Property, City Hall, Bethlehem, Pa. (Corp. M. Apr. '25)

**Bethlehem Steel Co.,** H. O. Hill, Asst. Chief Engr., Bethlehem, Pa. (Assoc. M. June '24)

**Bettis, Herman B.,** Mgr., Brown Co. Water Improvement Dist. No. 1, Box 118, Brownwood, Tex. (Jan. '44)

**Betts, W. M.,** *see* Barada & Page, Inc.

**Betz, L. Drew,** Chem. Engr., W. H. & L. D. Betz, Gillingham & Worth Sts., Philadelphia 24, Pa. (Apr. '39) *P*

**Beverly Hills Water Dept.,** John L. Perhab, Supt. & Mgr., Box 390, Beverly Hills, Calif. (Corp. M. Sept. '26)

**Bevington, F. E.,** Maint. Supt., Federal Housing Authority, 725—32nd St., Milwaukee 2, Ore. (Affil. Jan. '42) *M*

**Bevington, Warren C.,** Pres., Bevington, Taggart & Fowler, 730 K. of P. Bldg., Indianapolis 4, Ind. (Jan. '44) *P*

**Beyer, Walter R.,** Business Mgr., Univ. of the South, Sewanee, Tenn. (Jan. '44) *M*

**Bibeau, Joseph A.,** Supt., Public Works & Water Works, City Hall, St. Boniface, Man., Can. (Oct. '42)

**Bickley, Creighton D.,** Borough Engr. & Water Supt., Borough of North Caldwell, Allen Rd., North Caldwell, N.J. (Jan. '42)

**Biddle, Earl W.,** 149 Summit Rd., Elizabeth, N.J. (Oct. '37)

**Biddle, Herbert M.,** *see* Carolina Beach, Town of

**Bidwell, Bruce,** Owner & Mgr., Bidwell Water Co., Greenville, Plumas County, Calif. (Oct. '42)

**Biggs, George W., Jr.,** Chief Engr., American Water Works & Elec. Co., 50 Broad St., New York 4, N.Y. (June '16)

**Biggs, M. D.,** Supt., Water Works, City Water Dept., Martin, Tenn. (Oct. '40)

**Biglow, P. K.,** Street & Water Supt., 312—10th St., Antioch, Calif. (Oct. '43)

**Bilbrough, A. M.,** Toronto Mgr., Mussens Canada Ltd., 305 Terminal Warehouse Bldg., Toronto 1, Ont., Can. (Apr. '43)

**Billings, Clayton H.,** Chief Asst. Engr., State Dept. of Health, Austin 2, Tex. (Oct. '43) *M*

**Billings, L. C.,** Supt. & Chief Chemist, Water & Sewage Treatment, Dallas 1, Tex. (May '23) *MP*

**Binder, H. P.,** *see* Allis-Chalmers Mfg. Co.

**Bingham & Taylor Corp.,** Joe H. Gardner, 575 Howard St., Buffalo 6, N.Y. (Assoc. M. Mar. '82)

**Binghamton Bureau of Water,** Simon P. Carman, Supt. & Engr., Municipal Bldg., Binghamton, N.Y. (Corp. M. July '35)

**Bingley, W. McLean,** 87 Sheridan Drive, N.E., Atlanta, Ga. (Mar. '34) ★

**Binner, Fred E.,** Supt. of Conduits, Denver Munic. Water Works, R. 2, Box 158, Littleton, Colo. (Apr. '40)

**Birch Mfg. Co.,** Wm. T. Birch, 1523 Sedgwick St., Chicago 10, Ill. (Assoc. M. May '16)

**Birch, Wm. T.,** *see* Birch Mfg. Co.

**Bird, Byron,** 218 Kennedy Drive, Chevy Chase 15, Md. (July '24) *P* ★

**Bird, Cyrus R.,** The Pitometer Co., 205 W. Wacker Drive, Chicago Ill. (Mar. '22)

**Bird, Harold E.,** Structural Eng. Assoc., Dept. of Water & Power, 2281 Parnell Ave., Los Angeles 25, Calif. (Oct. '43)

**Bird, L. C.,** *see* Phipps & Bird, Inc.

**Bird-Archer Co.,** George H. Sill, 4337 N. American St., Philadelphia 40, Pa. (Assoc. M. July '29)

**Bird-Archer Co., Ltd.,** H. C. Harragin, Pres., McGill Bldg., Montreal, Que., Can. (Assoc. M. Oct. '37)

**Birdsall, Lewis I.,** Box 75, Glencoe, Ill. (June '13) *P*

**Birdsboro Water Co.,** C. K. Manwiller, Treas., Birdsboro, Pa. (Corp. M. Jan. '44)

**Birkeness, O. T.,** Mfr.'s Repr., 809 Washington Blvd., Chicago 7, Ill. (May '30) *P*

**Birmingham Industrial Water Supply System,** J. D. Webb, Chief Exec. Officer, 407 City Hall, Birmingham 3, Ala. (Corp. M. Jan. '44)

**Birmingham Water Co.,** Harold R. Bacon, Gen. Mgr., 33 Elizabeth St., Derby, Conn. (Corp. M. May '09)

**Bischoff, Robert,** 8 Lansing Ave., Troy, N.Y. (Jan. '41)

**Bivens, Ed. S.,** *see* Cannon Mills Co.

**Bivins, J. F.,** *see* Mount Airy, Town of

**Black, A. P.,** Prof. of Chem., Univ. of Florida, Gainesville, Fla. (Apr. '29) *Director '36–'39. Fuller Award '39.*

**Black, Ernest B.,** Cons. Engr., 4706 Broadway, Kansas City 2, Mo. (June '13) *AM*

**Black, Hayse H.,** Sr. San. Engr., State Dept. of Public Health, 1605 S. Douglas Ave., Springfield, Ill. (Oct. '33) ★

**Black, Henry R.,** Assoc. Civ. Engr., Bureau of Water Supply, 2124 Chelsea Terrace, Baltimore 16, Md. (July '42) *M*

**Black, Wallace,** Supt., Cedar Grove Water Dept., 206 Bowden Rd., Cedar Grove, N.J. (July '43) *M*

**Blackburn, Duncan A.,** Asst. Engr., Pasadena Water Dept., 319 City Hall, Pasadena 1, Calif. (Jan. '41) *M*

**Blackburn, Schuyler C.,** Assoc. Engr., Bureau of Water Supply, 1804 E. 31st St., Baltimore 18, Md. (Jan. '42) *M*

**Blackwelder, C. D.,** Vice-Pres., Reynolds Metals Co., Reynolds Metals Bldg., Richmond, Va. (May '26)

**Blaik, D. L.,** Salesman, Water Leak Detector Co., 112 N. 3rd St., Columbus 15, Ohio (Apr. '39)

**Blair, Clarence M.,** Cons. Engr., Box 236, 100 Crown St., New Haven, Conn. (Jan. 38)

**Blair, T. J., Jr.,** Vice-Pres. & Gen. Mgr., West Virginia Water Service Co., 814 Peoples Exchange Bldg., Charleston, W.Va. (Apr. '24)

**Blair, W. R.,** Mgr., American Cast Iron Pipe Co., 302 Sharon Bldg., 55 New Montgomery St., San Francisco 5, Calif. (Oct. '37)

**Blakeley, Loren E.,** 1112 Kilson Drive, Santa Ana, Calif. (July '42) *M*

**Blakeman, H. W.,** Supt., Light & Water Dept., Rayville, La. (Jan. '36)

**Blakeman, S. R.,** Supt., Water & Light Plant, Dyersburg, Tenn. (Jan. '27)

**Blalock, William W., Jr.,** Jr. Chemist, Fort Bragg Water Works, Box 5, Manchester, N.C. (July '42)

**Blanch G., Osvaldo J.,** Designing Engr., Ministerio de Obras Publicas, Este 2, No. 199, Caracas, Venezuela, S.A. (Jan. '42)

**Blanchard, C. A.,** Water & Sewer Supt., Ephrata, Wash. (Jan. '41) *M*

**Blanchard, R. K.,** Vice-Pres. & Engr., Neptune Meter Co., 50 W. 50th St., New York, N.Y. (June '19) *Fuller Award '42. M*

**Blankenship, Reginald L.,** 3310 Forest Hill Ave., Richmond, Va. (July '40)

**Blattner, L. P.,** *see* Chicago Pump Co.

**Bleckley, Logan, Jr.,** Dist. Repr., The Johnston & Jennings Co., 401 Volunteer Bldg., Atlanta 3, Ga. (Apr. '44) *MP*

**Blevins, L. P.,** Partner-Owner, Blevins Water Wells, Glenmore, La. (Jan. '44)

**Bliss, B. F.,** Gen. Mgr. & Vice-Pres., Independence Water Works Co., 123 W. Kansas, Independence, Mo. (Jan. '42)

**Blizzard, George,** Water Supt., Lamar, Colo. (Jan. '36)

**Blomquist, H. F.,** Supt., City Water Works, Cedar Rapids, Iowa (May '17) *MP*

**Bloodgood, Don E.,** Assoc. Prof. of San. Eng., Civil Engineering Bldg., Purdue Univ., Lafayette, Ind. (Jan. '44) *P*

**Bloomfield, Town of,** Jos. W. Obreiter, Town Engr., Bloomfield, N.J. (Corp. M. Oct. '37)

**Blue, J. R.,** Supervisor of Water & Sewers, Army Air Base, Perry, Fla. (July '44)

**Blum, Louis D.,** C.P.A., 110 E. 42nd St., New York 17, N.Y. (June '29) *A*

**Blumberg, Oscar C.,** 1619 Lincoln Ave., San Jose 10, Calif. (Feb. '30) *P*

**Blundon, J. Paul,** Cons. Engr., Law Bldg., Keyser, W.Va. (Apr. '30)

**Blust, T. L.,** Water Supt., Water & Sewer Dept., 812 Madison St., Silverton, Ore. (Jan. '43)

**Boardman, John,** Engr., Water Dept., 210 S. Poinsettia Ave., Compton, Calif. (Jan. '36)

**Boardman, John,** Engr., Interstate Com. on the Delaware River Basin, 581 Broad St. Station Bldg., Philadelphia 4, Pa. (Apr. '44)

**Boardman, William H.,** Civ. Engr., 426 Walnut St., Philadelphia, Pa. (Apr. '09)

**Bock, A. W.,** Gen. Supt., Texas Water Co., 6927 Appleton, Houston 9, Tex. (Oct. '39)

**Bock, Fred F.,** Executive, Artesian Well & Equipment Co., 30 Church St., New York 7, N.Y. (Apr. '42)

**Boeckel, Danilo,** Supt., Cia Brasileira de Aguas e Esgotos, Passo da Patria 156, Niteroi, Brazil, S.A. (Apr. '44)

**Boen, Doyle F.,** Civ. Eng. Assoc., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '43)

**Boes, Robert J.,** Industrial Research Engr., Minnesota & Ontario Paper Co., International Falls, Minn. (Oct. '42) *P*

**Boezinger, H.,** Pacific Coast Dist. Mgr., Pittsburgh Equitable Meter Co., 3136 E. 11th St., Los Angeles 23, Calif. (Oct. '42)

**Bogert, Clinton L.,** Cons. Engr., 624 Madison Ave., New York 22, N.Y. (Jan. '24)

**Boggs, Harry,** C.P.A., 803 Electric Bldg., Indianapolis 4, Ind. (Mar. '30) *A*

**Bohannon, F. D.,** *see* Murphysboro Water Co.

**Bohmann, H. P.,** 2019 E. Kenwood Blvd., Milwaukee 11, Wis. (May '13)

**Boles, Claude E.,** San. Engr., Caddo-Shreveport Health Unit, Box 1097, Shreveport B, La. (Oct. '42) *P* ★

**Bolieau, Clifton W.,** Mech. Engr., Design Div., Tennessee Valley Authority, 207 Union Bldg., Knoxville, Tenn. (Apr. '42) *P*

**Boling, Fred E.,** Supt., Water Works, 500 National Ave., West Terre Haute, Ind. (Apr. '44) *AMP*

**Bollenbach, W. M.,** *see* Johnson, Edward E., Inc.

**Bollier, R. C.,** Water & Sewer Supt., Water Dept., Alamosa, Colo. (Jan. '43)

**Bolson, John W.,** *see* Oconomowoc Water Dept.

**Boncher, Hector P.,** Gen. Mgr., Bradford Div., Dresser Mfg. Co., Bradford, Pa. (Jan. '37)

**Bond, Horatio,** Chief Engr., National Fire Protection Assn., 60 Batterymarch St., Boston 10, Mass. (July '39)

**Bond, Robert M.,** Asst. Acct., Munic. Sec., Hydroelec. Power Com. of Ontario, 620 University Ave., Toronto 2, Ont., Can. (Apr. '38) *A*

**Bonham, H. E.,** Cons. Engr., Paul A. Uhlmann & Assoc., 2901 N. High St., Columbus 2, Ohio (Jan. '44) *P*

**Bonham Water Dept.,** R. A. Jackson, Supt., City Hall, Bonham, Tex. (Corp. M. Jan. '44)

**Bonn, George S.,** Research Engr., City Water, Light & Power Dept., City Hall, Springfield, Ill. (Jan. '40) ★

**Bonsib, Roy S.,** Safety Director, Medical Dept., Standard Oil Co. of New Jersey, 30 Rockefeller Plaza, New York 20, N.Y. (Jan. '43) *MP*

**Bonyun, Richard E.,** Gen. Supt., Passaic Valley Water Com., 137 Ellison St., Paterson 1, N.J. (Oct. '35) *M*

**Booker, Warren H.,** City Health Dept., 128 W. Commerce St., San Antonio 5, Tex. (Dec. '31) *P*

**Boone, Dan M.,** *see* Little Rock Munic. Water Works

**Boone Water Dept.,** Geo. A. Nelson, Supt., Boone, Iowa (Corp. M. Jan. '40)

**Boord, Fredrick R.,** Jr. Treatment Plant Operator, Water Dept., 2013 S.W. 11th Ct., Fort Lauderdale, Fla. (July '43)

**Booth, A. A. K.,** Spring Hill, Storrs, Conn. (Oct. '40)

**Booth, George W.,** National Board of Fire Underwriters, 85 John St., New York 7, N.Y. (Feb. '24) *M*

**Boquist, Walter H.,** 6305 Boulevard East, West New York, N.J. (Jan. '41) *A*

**Bordelon, H. E.,** Chief Engr., State Hospital, Benton, Ark. (July '44)

**Borden, Moro M.,** Vice-Pres., Simplex Valve & Meter Co., Philadelphia 42, Pa. (June '12) *P*

**Borgford, Th. B.,** 4019 Hingston Ave., Ave., N.D.G., Montreal, Que., Can. (Jan. '37)

**Boriss, Marion E.,** Capt., Sn. C., Camp San. Engr., Station Hospital, Camp Claiborne, La. (Jan. '44) ★

**Bork, J. F.,** Treas. & Gen. Mgr., East Brainerd Utility Dist., 100 E. Brainerd Rd., Chattanooga 4, Tenn. (Jan. '41)

**Bornemann, George F.,** Supt., Massapequa Water Dist., Central Ave., Massapequa, N.Y. (Apr. '38)

**Borst, George E.,** Mgr., Philadelphia Office, Chicago Bridge & Iron Co., 1700 Walnut St., Philadelphia 3, Pa. (Apr. '44) *P*

**Borton, Fred W.,** Member of Board, Dept. of Water & Sewers, Box 3741, Miami, Fla. (Apr. '42)

**Bott, Roderick F.,** Asst. San. Engr., State Board of Health, Chippewa Falls, Wis. (July '44) *P*

**Botten, H. H.,** Asst. Mgr., Washington Survey & Rating Bureau, Box 1818, Seattle 11, Wash. (Jan. '24)

**Boucher, George,** *see* Paris Public Utilities Com.

**Boudreau, A. J.,** Supt., Water & Light, Keewatin, Minn. (Oct. '40) *M*

**Boulder Water Dept.,** H. C. McClintock, City Mgr., Boulder, Colo (Corp. M. Jan. '27)

**Boulware, C. E.,** Supt., Munic. Water Works, Markle, Ind. (Affil. Jan. '39)

**Bourbon Copper & Brass Works Co.,** 618 E. Front St., Cincinnati, Ohio (Assoc. M. Apr. '84)

**Bourgin, Charles G.,** Acting Supt., Bureau of Water Supply, 54 Watchung Ave., Montclair, N.J. (July '37) *AMP*

**Boutall, Chas. A.,** Vice-Pres., East Jefferson Water Works No. 1, Route 3, East End, Jefferson Parish 19, La. (Oct. '42) *A*

**Bovard, Paul F.,** California Filter Co., 981 Folsom St., San Francisco 7, Calif. (Aug. '26) *P*

**Bovee, Clifton,** Chemist, San. Eng. Div., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '40) ★

**Bow, Wilson F.,** Sr. Public Health Engr., State Dept. of Health, 1403 Smith Tower, Seattle 4, Wash. (Jan. '39) *MP*

**Bowe, Thomas F.,** Cons. Engr., 110 William St., New York 7, N.Y. (Feb. '20) ★

**Bowen, Charles Stanley,** 43 Rooney St., Burnley, Victoria, Australia (Feb. '29)

**Bowen, Ed,** Supt., Water Dept., Aberdeen, Wash. (Jan. '43) *P*

**Bowen, M. R.,** *see* Whittier, City of

**Bowen, Milton M.,** *see* Hill, Hubbell & Co. Div.

**Bowering, Reginald,** Public Health Engr., Provincial Board of Health, Parliament Bldgs., Victoria, B.C., Can. (Oct. '41) *P*

**Bowers, Eugene,** Chemist, 3182 Del Vina St., Pasadena, Calif. (Oct. '43) †

**Bowers, Herbert L.,** Service Mgr., The Permutit Co., 330 W. 42nd St., New York 18, N.Y. (Jan. '36) *P*

**Bowers, Samuel W.,** Supt. & Engr., Water Dept., 91 Main St., Southington, Conn. (Apr. '43) *M*

**Bowlby, H. V.,** *see* Stannard Power Equipment Co.

**Bowman, Abraham M.,** Supt. of Public Utilities, Elmira, Ont., Can. (Oct. '19) *Fuller Award '39. AM*

**Bowman, Ernest,** *see* Marinette Water Com.

**Bowman, Harry B.,** 2642 Baird Blvd., Camden, N.J. (Jan. '38) ★

**Bowser, Orval A.,** Supt. of Water Works, Box 21, Kittanning, Pa. (Apr. '40)

**Boxley, Jack D.,** Supt., Plant & Dist., Water Works Com., Box 249, Hopkinsville, Ky. (Apr. '43) *AMP*

**Boyce, Earnest,** Prof. of Munic. & San. Eng., College of Engineering, Univ. of Michigan, Ann Arbor, Mich. (Apr. '26) †

**Boyd, Fay E.,** Supt. of Water Works, Andover, N.Y. (Jan. '44) *P*

**Boyd, George E.,** New York Dist. Mgr., Wailes Dove-Hermiston Corp., 17 Battery Pl., New York 4, N.Y. (May '31)

**Boyd, H. W.,** Supt., Water Dept., Box 22, Williamstown, W.Va. (Affil. Jan. '39)

**Boykin, H. P.,** Assoc. Prof. of Civ. Eng., Virginia Military Institute, Lexington, Va. (Oct. '34)

**Boyle, John L.,** Mgr., Portland Office, Pacific States Cast Iron Pipe Co., 501 Spalding Bldg., Portland 4, Ore. (Jan. '35)

**Boyles, Richard H.,** Mgr.-Resident Engr., Fox Chapel Authority, Fox Chapel Rd., Pittsburgh 15, Pa. (July '40)

**Boynton, Perkins,** Chemist-in-Charge, Clarksburg Water Board, 228 Sumner St., Clarksburg, W.Va. (June '20) *Fuller Award '40.*

**Bozeman, City of,** Fred Quinnell, City Mgr., City Hall, Bozeman, Mont. (Corp. M. Jan. '33)

**Brackney, Fred,** *see* Canon City Water Dept.

**Bradley, C. J.,** *see* Dayton Foundry, Inc.

**Bradley, G. S.,** Asst. Dist. Mgr., West Virginia Water Service Co., 181 Summers St., Charleston, W.Va. (Jan. '44)

**Bradley, J. F.,** Chief Engr., R.F.D. No. 5, Valparaiso, Ind. (Feb. '21) *MP*

**Bradshaw, Arthur W.,** Asst. Analyst, North Jersey Dist. Water Supply Com., Wanaque, N.J. (Oct. '42) *P*

**Bradshaw, P.,** Test Engr., Production Dept., Gulf States Utilities Co., Neches Power Station, Beaumont, Tex. (July '44)

**Brady, R. D.,** Supt., Crossville Water Dept., Crossville, Tenn. (Apr. '41)

**Bragg, George H.,** Engr. of Maint., 245 Market St., San Francisco, Calif. (Oct. '22)

**Braidech, Mathew M.,** Prof. of Ind. & San. Chem., Case School of Applied Science, University Circle, Cleveland 6, Ohio (May '30) *Goodell Prize '36. P*

**Brainard, Elliott E.,** Treas., Lock Joint Pipe Co., Box 269, East Orange, N.J. (Jan. '37)

**Brakenridge, C.,** City Engr., City Hall, Vancouver, B.C., Can. (Nov. '23) *M*

**Braman, T. G.,** Mgr., Citizens Water Co., 62 E. Wheeling St., Washington, Pa. (Oct. '40) *M*

**Bramman, M. T.,** Pacific Coast Sales Mgr., National Cast Iron Pipe Co., 1930 W. Olympic Blvd., Los Angeles 6, Calif. (Jan. '43) *P*

**Brampton Water Com.,** J. Patterson, Chairman, Brampton, Ont., Can. (Corp. M. Feb. '23)

**Brandis, Fred E.,** Supt., Munic. Water Works, Blaine County, Chinook, Mont. (Mar. '25) *Fuller Award '39. M*

**Brannen, Francis M.,** Box E, Georgia School of Technology, Atlanta, Ga. (Jan. '42) *P*

**Branson, William S.,** Supt., Munic. Light & Water Plant, Municipal Bldg., Madisonville, Ky. (Jan. '40) *M*

**Brantford Public Utilities Com.,** R. Welsh, Chairman, Brantford, Ont., Can. (Corp. M. May '14)

**Brantly, E. C.,** Mgr., Water, Gas & Elec. Depts., Danville, Va. (Feb. '27) *M*

**Brash, Victor G.,** Civ. Engr., Water Dept., 502 E. Henderson Ave., Tampa 2, Fla. (July '44)

**Brashears, M. L., Jr.,** Assoc. Geologist, U.S. Geological Survey, 226 P.O. Bldg., Jamaica 3, N.Y. (Apr. '44) *M*

**Brattain, Otis,** Supt., Water Co., Carmel, Ind. (Apr. '44) *MP*

**Braun, E. J.,** *see* Fond du Lac City Water Dept.

**Brazil City Water Works,** Ted McCoy, Supt. of Utilities, 16 S. Washington St., Brazil, Ind. (Corp. M. Apr. '44)

**Bready, Ira J.,** Sales Engr., The Permutit Co., 3119 Griest Ave., Cincinnati 8, Ohio (Jan. '38) *P*

**Breckenridge, W. D.,** Borough Mgr., Grove City, Pa. (July '41) *MP*

**Brehm, Russell J.,** Chief Chemist, Dept. of Water & Sewers, Box 4821, Miami 31, Fla. (July '43) *P*

**Breitenbach, William E.,** Chem. Engr., Technical Dept., Rayonier, Inc., Port Angeles, Wash. (July '40)

**Breithaupt, J. C.,** *see* Kitchener Water Com.

**Breitkreutz, E. W.,** Asst. Engr., Water Distr., Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (Oct. '29) *M*

**Bremerman, E. S.,** Pres., B & B Combustion Equipment Co., 4030 Chontron Ave., St. Louis 10, Mo. (Apr. '44)

**Bremser, Martin,** Supt., Water Dept., City Hall, West Bend, Wis. (Jan. '43)

**Breniman, E. H.,** Supt., Water Dept., Box 43, Sinclair, Wyo. (Jan. '38) *MP*

**Brennan, M. G.,** Vice-Pres., The Stearns-Rogers Mfg. Co., 1720 California St., Denver, Colo. (July '42)

**Brennan, Ralph F.,** Supt., Munic. Water Treatment Plant, Daytona Beach, Fla. (Jan. '38)

**Brenneke, A. M.,** Cons. Engr., 1201 W. Walker St., Denison, Tex. (Oct. '34) *M*

**Bretz, C. E.,** 1221 N. Penna Ave., Oklahoma City, Okla. (Aug. '23)

**Brewer, E. E.,** Supt., Water Dept., City Hall, Shelton, Wash. (Apr. '41)

**Brewer, Howard Hawley,** Civ. Eng. Assoc., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (July '42) *P*

**Brickenden, F. M.,** 82 Cordova St., Winnipeg, Man., Can. (June '28)

**Brickey, M. L.,** Gen. Mgr., Knox County Water Co., Fountain City, Tenn. (July '35) *M*

**Bridgeport Brass Co.,** W. J. Hawkins, Asst. Sales Mgr., Mill Products Div., 30 Grand St., Bridgeport 2, Conn. (Assoc. M. July '44)

**Bridges, Carl,** *see* Crothersville Water & Elec. Dept.

**Briggs, Raymond J.,** Cons. Engr., Noble Bldg., Boise, Idaho (Jan. '41)

**Briggs, W. A., Bitumen Co., Inc.,** W. Ronald Briggs, 3303 Richmond St., Philadelphia, Pa. (Assoc. M. Jan. '35)

**Briggs, W. Ronald,** *see* Briggs, W. A., Bitumen Co., Inc.

**Bright, Marshall,** Supt. of Filtration, Pacific Mills, 9 Upland St., Lyman, S.C. (Jan. '39) *P*

**Brinck, C. W.,** Asst. Director, San. Eng. Div., State Board of Health, Helena, Mont. (Jan. '43) *P* ★

**Brinkerhoff, Marvin J.,** Secy., Bogota Water Co., 78 W. Main St., Bogota, N.J. (July '38)

**Brinkley, J. B.,** Water Supt., Water Dept., 3205 N. Broadacres, Vanport City, Ore. (July '43)

**Brisbane & Co.,** E. C. Brisbane, 8653 Atlantic Bldg., South Gate, Calif. (Jan. '44)

**Brisbane, E. C.,** *see* Brisbane & Co.

**Bristol, H. C.,** 401 Ramsey St., Alcoa, Tenn. (July '35) *MP*

**Bristol, Tenn., City of,** R. J. Mottern, Comr., Dept. of Streets & Public Property, Bristol, Tenn. (Corp. M. July '38)

**Bristol, Theodore L.,** Pres. & Mgr., Ansonia Water Co., 354 Main St., Ansonia, Conn. (June '34) *AM*

**Bristol, Va., City of,** P. A. Goodwyn, Acting City Mgr., Bristol, Va. (Corp. M. Jan. '40)

**Britton, J. C.,** Supt., Avon Lake Water Dept., Groveland Drive, Avon Lake, Ohio (Affil. Jan. '40) *P*

**Brock, B. H.,** Mgr., Lancaster Suburban Water Co., 100 S. President Ave., Lancaster, Pa. (Jan. '44) *M*

**Brokaw, Arthur,** Town Engr., 853 Kearny Ave., Kearny, N.J. (Apr. '43) *M*

**Brookfield-North Riverside Water Com.,** A. R. Buller, Engr., 8636 Brookfield Ave., Brookfield, Ill. (Corp. M. Apr. '42)

**Bradner, E. A.,** *see* New Mexico Power Co.—Agua Pura Div.

**Brooks, C. B.,** *see* Hemp Water Dept.

**Brooks, Frank M.,** *see* Art Concrete Works

**Brooks, Fred,** Supt., Pipe Constr., Bureau of Water Works & Supply, 1308 Micheltorena St., Los Angeles, Calif. (Apr. '36)

**Brooks, Harry L.,** Supt., Water Dept., Osgood, Ind. (Apr. '32)

**Brooks, John N.,** 339 Bellevue Ave., Trenton 8, N.J. (Feb. '12)

**Brooks, Thomas,** 2045 N. Catalina St., Los Angeles 27, Calif. (Sept. '25) *Honorary M. '37.*

**Brotz, J. K.,** *see* Silver Creek Water Works

**Brouillette, Carl V.,** 121 S. Leonard St., Liberty, Mo. (Oct. '41) ★

**Brower, Frank,** Water Supt., Borough of Union Beach, Poole Ave., Union Beach, R.F.D. No. 1, Keyport, N.J. (Oct. '43)

**Brown, C. A.,** Mgr., Arkadelphia Water Co., Inc., Arkadelphia, Ark. (Jan. '43) *M*

**Brown, C. E.,** Mgr., Public Utilities Com., Meaford, Ont., Can. (Mar. '32)

**Brown, C. V.,** Supt., Water, Sewerage & Streets, Jonesboro, Ga. (Apr. '43)

**Brown, Carl N.,** Asst. Western Sales Mgr., U.S. Pipe & Foundry Co., 122 S. Michigan Ave., Chicago 3, Ill. (Oct. '39)

**Brown, Claude R.,** Mgr., American Cast Iron Pipe Co., 412 W. 6th St., Los Angeles 14, Calif. (Aug. '31) *M*

**Brown, Cleo E.,** Supt., Munic. Water Plant, 711 N. Independence St., Harrisonville, Mo. (July '39)

**Brown, E. W.,** *see* Kentucky Utilities Co.

**Brown, Edgar T.,** Supt., City Water Plant, Fayetteville, Ark. (Oct. '42) *M*

**Brown, Edward,** Supt. of Water Works, Eau Claire, Wis. (Jan. '21)

**Brown, Elliot C.,** Cons. Chief Engr., Virginia Hot Springs, Inc., Hot Springs, Va. (Apr. '44)

**Brown, George C.,** Chief Engr., City of Toronto, 40 Rathnelly Ave., Toronto, Ont., Can. (July '41)

**Brown, H. C.,** Vice-Pres., Chicago Bridge & Iron Co., 165 Broadway, New York 6, N.Y. (Apr. '44)

**Brown, Herbert H.,** Supt. of Water Works, City Hall, Milwaukee 2, Wis. (Nov. '29) *Director '40–'43. Fuller Award '44.*

**Brown, Horace A.,** Cons. Engr. & Supt. of Water Works, Ottumwa, Iowa (June '11) *M*

**Brown, J. B.,** Pres., Erwin Water Co., Erwin, Tenn. (Apr. '40)

**Brown, J. H.,** *see* Niagara Water Dept.

**Brown, J. O.,** Mgr., Pump & Eng. Dept., Crane-O'Fallon Co., 1631 Fifteenth St., Denver 17, Colo. (Jan. '30)

**Brown, James R.,** National Water Main Cleaning Co., 205 W. Wacker Drive, Chicago 6, Ill. (July '34) *M*

**Brown, John L., Jr.,** Supt., Cannon Mills Co., Box 242, Concord, N.C. (Jan. '39) ★

**Brown, K. W.,** Chem. Engr., 233 Sansome St., San Francisco 4, Calif. (July '27) *P*

**Brown, L. V. Z.,** 3900 Purdue St., Dallas 5, Tex. (July '38) ★

**Brown, M. W.,** *see* Orlando Public Utilities Com.

**Brown, Ross M.,** Supt. of Water Works, 126 Lake St., Plymouth, Ind. (Jan. '41) *M*

**Brown, Samuel,** Asst. Civ. Engr., Bureau of Water Supply, 6301 Bellona Ave., Baltimore, Md. (Oct. '42)

**Brown, Stuart,** Supt., Light & Water Dept., West Point, Ga. (Apr. '43) *MP*

**Brown, Wade Gillies,** Chemist, Water Dept., 2018 Sunset Ave., Durham, N.C. (Apr. '43)

**Brown, Walter M.,** Office Engr., Long Beach Water Dept., 400 Municipal Utilities Bldg., Long Beach 2, Calif. (May '34) *A*

**Browne, F. G.,** *see* Teck, Township of

**Browne, Floyd G.,** San. Engr., 196 S. Main St., Marion, Ohio (June '26) *P*

**Brownell, O. E.,** Public Health Engr., State Dept. of Health, Div. of Sanitation, University Campus, Minneapolis, Minn. (Apr. '32) *P*

**Browning, C. R.,** Cons. Engr., The Irvine Co., Tustin, Orange County, Calif. (Nov. '32)

**Browning, Robert T.,** Wallace & Tiernan Co., Inc., Newark 1, N.J. (Apr. '36)

**Brownson, Bruce,** City Mgr., City Hall, Grand Junction, Colo. (Jan. '40)

**Brownstead, J. P.,** Supt. of Water Works, 921 Prospect Pl., Ashland, Ky. (Apr. '38) *Fuller Award '41. MP*

**Bruck, Clyde,** Meter Repair Foreman, Cincinnati Water Works, 421 Central Ave., Cincinnati 2, Ohio (Apr. '43) *M*

**Bruden, C. O.,** Wallace & Tiernan Co., Inc., 432—119 E. Washington Ave., Madison, Wis. (Mar. '29)

**Brumbaugh, W. V.,** Secy., National Lime Assn., 927—15th St., N.W., Washington 5, D.C. (Mar. '29)

**Brune, Fred H.,** Sales Mgr., Rensselaer Valve Co., Monadnock Bldg., Chicago 4, Ill. (Sept. '31) *MP*

**Brunstein, Maurice,** Asst. Supt. & Engr., 311 City Hall Annex, Atlantic City, N.J. (July '35) *MP*

**Brunswick & Topsham Water Dist.,** Theodore E. Stimpson, Supt. & Treas., 9 Town Hall Pl., Brunswick, Me. (Corp. M. Jan. '43)

**Brunton, Chas. L.,** Supt., Jackson Mutual Water Co., Main St., Jackson, Ohio (July '35)

**Brush, Frederick Clinton,** Mgr., Bound Brook Water Co., 519 Watchung Rd., Bound Brook, N.J. (Jan. '24) *AMP*

**Brush, Wm. W.,** 440 Park Ave., New York 22, N.Y. (Feb. '11) *Treasurer '22–'27, '30–. Vice-Pres. '28. President '29. Diven Medal '32. Honorary M. '37. AMP*

**Bryan, A. C.,** 777 Suebarnett Drive, Houston 8, Tex. (July '43) *M*

**Bryan, John G.,** Asst. to Water & Sewer Dept., Borough of Pitman, 58 Simpson Ave., Pitman, N.J. (Apr. '42) *M*

**Bryan, W. D., Jr.,** Mgr., Water Plant, Tarboro, N.C. (July '40) ★

**Bryan, Wayne G.,** Supt., Water Dept., Portage, Wis. (July '37)

**Bryant, W. G.,** Supt., Light, Water & Sewerage Dept., Griffin, Ga. (Jan. '44) *AM*

**Bryson, Carlyle H.,** Supt., Water Div., Utilities Dept., Utilities Bldg., 18–20 S. Nevada Ave., Colorado Springs, Colo. (Apr. '42) *M*

**Buccowich, Paul, Jr.,** Supt., Light & Water Dept., Ely, Minn. (May '33)

**Buchanan, Bruce,** Pres., Bruce Buchanan, Inc., 509 Pontiac Bank Bldg., Pontiac, Mich. (July '41)

**Buchanan, Edward Victor,** Gen. Mgr., Public Utilities Com., London, Ont., Can. (Apr. '26)

**Buchanan, Gerrit S.,** R.D. No. 6, Washington, Pa. (June '30)

**Buchanan, Hugh,** Cia Consolidada de Aguas, Corrientes del Rosario Ltda., Rosario de Santa Fe, Argentina, S.A. (June '24)

**Buchanan, J. K.,** Vice-Pres., Monongahela System, Fairmont, W.Va. (Oct. '40) *Fuller Award '44.*

**Buck, George H.,** Cons. Engr., 4704 Chevy Chase Blvd., Chevy Chase 15, Md. (Jan. '26)

**Buck, Ross J.,** Sr. Civ. Engr., R & U Branch, 5th Service Command, 501 E. Main Cross St., Edinburg, Ind. (July '43)

**Buck, Ross Willis,** Asst. Engr., Dept. of Water, 2140 Ravenwood, Dayton 6, Ohio (Apr. '43) *M*

**Buckingham, J. E.,** Supt. & City Engr., Water Dept., Raymond, Wash. (Apr. '39) *M*

**Buckley, Earl John,** Sales Engr., W. J. Westaway Co., Ltd., 38 Main St., West, Hamilton, Ont., Can. (Jan. '44) *P*

**Buffalo Div. of Water,** Alan D. Drake, Director of Water, City Hall, Buffalo 2, N.Y. (Corp. M. June '21)

**Buffalo Meter Co.,** Chas. K. Bassett, 2917 Main St., Buffalo, N.Y. (Assoc. M. June '05)

**Buffalo Niagara Elec. Corp.,** Louis S. Bernstein, Electric Bldg., Buffalo 3, N.Y. (Corp. M. Apr. '37)

**Bugbee, Alvin,** Supt. & Engr., Trenton Water Dept., 565 Rutherford Ave., Trenton, N.J. (July '39)

**Bugher, S. B.,** Supt., Water Dept., Reidsville, N.C. (Jan. '30)

**Buhler, William,** Town Mgr., Wray, Colo. (Oct. '37)

**Builders-Providence, Inc.,** Chas. G. Richardson, Vice-Pres., 9 Codding St., Providence, R.I. (Assoc. M. June '01)

**Bull, Clayton C.,** Cons. San. Engr., Burgess & Niple, 568 E. Broad St., Columbus 15, Ohio (July '44) *P*

**Bull, Irving C.,** Cons. Chemist, 86 Highland Ave., Middletown, N.Y. (June '06)

**Buller, A. R.,** *see* Brookfield-North Riverside Water Com.

**Bullock, DeWitt H.,** Supt. of Water System, 80 Walnut St., Canajoharie, N.Y. (Jan. '28) *MP*

**Bundy, Dan E.,** Water Works Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Apr. '38)

**Bunker, George C.,** Cons. Engr., Apdo. 168, Caracas, Venezuela, S.A. (Feb. '11) *Honorary M. '43.*

**Bunnell, Kenneth J.,** Asst. Supt. of Water Plants, Metropolitan Utilities Dist., 5335 N. 25th Ave., Omaha 11, Neb. (June '34) *MP*

**Burack, William D.,** Engr., 77 Sycamore Ave., Livingston, N.J. (Jan. '36) *P*

**Buratti, Carl,** Johns-Manville Sales Corp., 1207 Architects Bldg., Los Angeles 13, Calif. (Jan. '38)

**Burbank Public Service Dept.,** J. H. McCambridge, Gen. Mgr., 174 W. Magnolia Blvd., Burbank, Calif. (Corp. M. June '27)

**Burchard, Edwin Day,** Dist. Engr., U.S. Geological Survey, Box 2719, Raleigh, N.C. (Jan. '25)

**Burdick, C. W.,** Comr., City Water & Light Dept., City Hall, Grand Island, Neb. (July '44) *M*

**Burdick, Charles B.,** Hydr. & San. Engr., 20 N. Wacker Drive, Chicago 6, Ill. (July '07) *Honorary M. '44.*

**Burdick, George E.,** *see* New York State Conservation Dept.

**Burdick, Oliver,** 8904 S. Military Rd., Niagara Falls, N.Y. (Apr. '42)

**Burgess, George S.,** *see* New Jersey State Water Policy Com.

**Burgess, Henry C.,** Chem. Engr., 35 E. Wacker Drive, Chicago, Ill. (July '41) ★

**Burgess, John,** Office Engr., Board of Water Comrs., Box 629, Denver 1, Colo. (Oct. '37) *M*

**Burgess, Philip,** Cons. Engr., 568 E. Broad St., Columbus 15, Ohio (Apr. '11) *Fuller Award '44. MP*

**Burgess, R. V.,** Town Clerk, Leaside, Ont., Can. (Apr. '41)

**Burgum, Harry P.,** *see* Minneapolis Com. of Water Works

**Burke, Thomas G.,** *see* Plattsburg, City of

**Burket, Robert,** *see* Abercrombie, J. S., Co.

**Burley, City of,** Ivin Hoggan, Chairman of Water Dept., Court House, Burley, Idaho (Corp. M. Apr. '44)

**Burn, G. A. H.,** Assoc. San. Engr., Ontario Dept. of Health, 203 Humbercrest Blvd., Toronto, Ont., Can. (Jan. '43)

**Burnett, B. Julian,** Service Engr., Hercules Powder Co., 4737 Kerle St., Jacksonville 5, Fla. (July '44) *P*

**Burnett, H. A., Jr.,** Gen. Mgr., Difco Labs., Inc., 920 Henry St., Detroit 1, Mich. (Jan. '36)

**Burnett, Kenneth J.,** Jr. Salesman, Lynchburg Foundry Co., Lynchburg, Va. (Jan. '43)

**Burnett, Thad C.,** *see* Asheville, City of

**Burnham, Lyle M.,** Supt., Water Works, Civic Center, Bartlesville, Okla. (Oct. '40) ★

**Burnie, Arthur N.,** Consumers Water Co., Box 151, Pearl St. Station, Portland 6, Me. (Mar. '16)

**Burns, Ross,** Sales Repr., Pittsburgh Equitable Meter Co., 1455 W. Congress St., Chicago 7, Ill. (Oct. '38)

**Burnson, Blair I.,** East Bay Munic. Utility Dist., Box 720, Oakland 4, Calif. (Jan. '35) *P*

**Burton, H. K.,** *see* Salt Lake City Corp. Water Dept.

**Buroker, H. M.,** Mgr., Light & Water Dept., Bonners Ferry, Idaho (Jan. '39)

**Burrill, Harold G.,** Lt. Col., Railroad & Utilities Officer, Aberdeen Proving Ground, Md. (July '44) *M* ★

**Burrin, Thos. J.,** Supt. of Utilities, Lebanon Water Works, 206 W. Washington St., Lebanon, Ind. (Jan. '35)

**Burroughs Adding Machine Co.,** A. Knaff, Public Utilities Sales, 6071 Second Blvd., Detroit 32, Mich. (Assoc. M. Mar. '26)

**Burt, Burke,** 1211 N. LaSalle St., Chicago 10, Ill. (July '42) *P*

**Burwell, John H.,** *see* Schenectady, City of

**Bush, Bernard S.,** Dist. Engr., Pennsylvania Dept. of Health, Kirby Health Center, Wilkes-Barre, Pa. (Apr. '44) *P*

**Bush, Wesley A.,** Owner, Parker Water Works Co., Parker, Ariz. (Apr. '42)

**Bushway, Walter B.,** Supt., Water Dept., Town Hall, Brookline 46, Mass. (Jan. '42) *M*

**Buswell, A. M.,** Chief, State Water Survey Div., Urbana, Ill. (Mar. '16) *P* ★

**Butera, Nelson S.,** 186 Mills St., Morristown, N.J. (Apr. '44) *AMP*

**Butler, T. C., Jr.,** Hydr. Engr., Pomona Pump Co., Route 3, Boise, Idaho (Jan. '40)

**Buttenheim, Edgar J.,** *see American City*

**Buttler, L. S.,** 246 N. 26th St., Camp Hill, Pa. (Jan. '39)

**Buzzard, Lester L.,** Sales Mgr., Hays Manufacturing Co., 801 W. 12th St., Erie, Pa. (Apr. '41) *M*

**Byerley, E. F.,** Local Mgr., Arkansas Utilities Co., 121 N. 1st St., West Helena, Ark. (Apr. '43) *M*

**Byers, A. M., Co.,** M. J. Czarniecki, Vice-Pres., Clark Bldg., Pittsburgh 22, Pa. (Assoc. M. June '21)

**Byers, Chester A.,** Asst. Gen. Mgr. Johnstown Water Co., 332 Locust St., Johnstown, Pa. (Apr. '37) *M*

**Byrne, Walter S.,** Gen. Mgr., Metropolitan Utilities Dist., Utilities Bldg., Omaha 2, Neb. (Oct. '39) *M*

**Byron, E. J.,** Water Supt., Jacksonville, Tex. (Jan. '44) *M*

**Byron, J. Colbert,** San. Chemist, Bangor Water Dept., R.F.D. No. 7, Bangor, Me. (Jan. '41) ★

**Byron Jackson Co.,** W. N. Beadle, Vice-Pres., Box 2017 Terminal Annex, Los Angeles 54, Calif. (Assoc. M. Sept. '24)

**Cadman, Robert M.,** 244 Cambridge Ave., Red Bank, N.J. (May '24)

**Cadmus, Peter H.,** Supt. of Shops & Meters, Water Dept., City Hall, East Orange, N.J. (Affil. Oct. '38)

**Cady, H. R.,** Mech. Engr., Hackensack Water Co., New Milford, N.J. (June '29) *M*

**Cady, Lowell,** Engr., Wiedeman & Singleton, 712 Cumberland Circle, N.E., Atlanta, Ga. (Jan. '40) *P*

**Cain, Giles L.,** Supt., City Water Works, 224 N. Main St., South Bend 5, Ind. (Jan. '39) *A*

**Cain, James D.,** Fairmont, W.Va. (Jan. '43)

**Cain, Tom. J.,** Div. Patrolman, Metropolitan Water Dist., 1349 Elwood Ave., Pomona, Calif. (Oct. '43) *M*

**Caird, James M.,** Chemist & Bacteriologist, Cannon Bldg., Broadway & 2nd St., Troy, N.Y. (May '00) *Treasurer '14–'21. Honorary M. '42. P*

**Calder, Norman,** Supt. & Chairman, Southampton Public Utilities, Southampton, Ont., Can. (Apr. '42)

**Calderara, Orall J.,** San. Engr. (R), U.S. Public Health Service, Box 3277, Tampa, Fla. (Oct. '40)

**Caldwell, David H.,** 214 E.M.L., Univ. of California, Berkeley 4, Calif. (Jan. '41) *P*

**Caldwell, H. L.,** Cons. Engr., Caldwell Engineering Co., Jacksonville, Ill. (Apr. '36) *P*

**Caldwell, James A.,** 210 W. 14th St., Rushville, Ind. (Apr. '36) *M*

**Calgon, Inc.,** Everett P. Partridge, Director of Research, Hagan Bldg., Pittsburgh 30, Pa. (Assoc. M. Jan. '39)

**California Corrugated Culvert Co.,** L. W. Hanson, Fifth & Parker Sts., West Berkeley 2, Calif. (Assoc. M. Aug. '27)

**California Oregon Power Co., The,** Harry Olsen, Medford, Ore. (Corp. M. Apr. '40)

**Call, Albert L.,** Supt., Las Flores Water Co., 428 Sacramento St., Altadena, Calif. (Apr. '41)

**Callahan, Harry C.,** Pres., Lake Mohawk-Sparta Water Co., White Deer Plaza, Sparta, N.J. (Jan. '37) *M*

**Callan, John,** *see* Tennessee Eastman Corp.

**Calvert, Cecil K.,** Supt. of Purif., Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Nov. '20) *Director '40–'43. Fuller Award '43. P*

**Calvert, I. R.,** Secy.-Mgr., Azusa Irrigating Co., 617 Azusa Ave., Azusa, Calif. (Jan. '44) *M*

**Calvet, Carlos M.,** *see* Cuba, Cia de Acueducto de, S.A.

**Cambridge, W. B.,** Dist. Sales & Service Mgr., Hersey Mfg. Co., 50 Church St., New York 7, N.Y. (Apr. '43)

**Camden Public Works Dept.,** Frank A. Abbott, Comr., Water Bureau, City Hall, Camden, N.J. (Corp. M. Oct. '43)

**Camel, Blaise G.,** Chairman, Finance Com., East Jefferson Water Works No. 1, 503 Lake Ave., Metairie, La. (Oct. '42)

**Cameron, G. T.,** Supervisor, Cherry Tree Water Co., Cherry Tree, Indiana County, Pa. (July '43) *M*

**Cameron, W. J. D.,** Civ. Engr., Anthes Foundry, Ltd., Saskatchewan Ave., Winnipeg, Man., Can. (Jan. '40)

**Camp, Fred Albert,** Civ. Eng. Assoc., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Apr. '43)

**Camp, T. A.,** *see* Mineral Wells City Water Works

**Camp, Thomas R.,** Cons. Engr., Statler Office Bldg., Boston 16, Mass. (Jan. '30)

**Campbell, Archie,** Supt. of Water Works, Cloquet, Minn. (July '35)

**Campbell, Elmer W.,** Div. of San. Eng., Bureau of Health, Augusta, Me. (Dec. '23) ★

**Campbell, Garnet H.,** *see* St. Clair, City of

**Campbell, Glen W.,** Chemist, Water Dept., 710 Forest St., Bellingham, Wash. (Apr. '38) *P* ★

**Campbell, John T.,** The Chester Engrs., 210 E. Parkway at Sandusky, N.S., Pittsburgh 12, Pa. (Oct. '31) *P*

**Campbell, Joseph D.,** Supt., Merchantville-Pennsauken Water Com., 13 W. Maple Ave., Merchantville, N.J. (Oct. '38)

**Campbell, M. S.,** Chief, Div. of Public Health Eng., State Dept. of Health, 1412 Smith Tower, Seattle 4, Wash. (Apr. '38)

**Campbell, M. S. A.,** Bacteriologist II, State Board of Health, 1098 W. Michigan St., Indianapolis, Ind. (July '35)

**Campbell, Ralph A.,** Supt., Div. of Accts., 161 Civic Center Bldg., San Diego 1, Calif. (July '42) *AM*

**Campbell, S. E.,** Secy. & Mgr., Boonville Water Co., Boonville, Ark. (Oct. '40)

**Campbell, W. F.,** Field Engr., Fairbanks Morse Co., 1226—1st Ave., S., Seattle, 4, Wash. (Apr. '44) *MP*

**Campbell, William B.,** Sales Engr., A. P. Smith Mfg. Co., 315 N. Crescent St., Flandreau 4, S.D. (Jan. '43)

**Campion, Harry,** Supt. of Water Works, City Hall, Defiance, Ohio (Apr. '44) *MP*

**Camy, L. L.,** Local Mgr., California Water Service Co., 4492 Whittier Blvd., Los Angeles 22, Calif. (May '30) *M*

**Canadian Engineer Publications,** *see Water & Sewage*

**Canastota Water Dept.,** Jay H. Ostrander, Center St., Canastota, N.Y. (Corp. M. Oct. '41)

**Cannady, D. L.,** Supt. of Water & Sewers, Manteo, N.C. (July '43)

**Cannard, Richard E.,** Engr., Manitowoc Public Utilities Com., 817 Franklin St., Manitowoc, Wis. (Jan. '42)

**Cannon Mills Co.,** Ed. S. Bivens, Supt., Kannapolis, N.C. (Corp. M. Oct. '42)

**Cannon, Samuel C.,** *see* Middletown Water Dept.

**Canon City Water Dept.,** Fred Brackney, Supt., Box 407, Canon City, Colo. (Corp. M. Apr. '26)

**Cantley, Clarence G.,** Filter Operator, Water Works Dept., Box 333, Clendenin, W.Va. (Affil. Jan. '40)

**Canton Munic. Utilities,** Water Works Dept., Tip H. Allen, Supt., Box 114, Canton, Miss. (Corp M. Jan. '39)

**Cantrell, E. L.,** Dist. Mgr., Neptune Meter Co., 815 W. Market St., Louisville 2, Ky. (Apr. '39)

**Cantrell, Frank M.,** Supt., Water Works, Etowah, Tenn. (Apr. '41)

**Canuso, Francis A., Sr.,** Francis A. Canuso & Son, General Contractors, 804 S. 12th St., Philadelphia 47, Pa. (Apr. '44)

**Capen, Charles H., Jr.,** Chief Engr., North Jersey Dist. Water Supply Com., Wanaque, N.J. (Apr. '30) *Fuller Award '38. M*

**Caplan, Louis R.,** 609 Fourth St., Laurel, Md. (Oct. '39) *P* ★

**Capraro, Paul E.,** Supt., Water & Light Dept., Two Rivers, Wis. (Jan. '43)

**Capron, John D.,** Pres., Glamorgan Pipe & Foundry Co., Lynchburg, Va. (Jan. '24) *M*

**Carbide & Carbon Chemical Corp.,** Thomas Roper Jr., Chem. Engr., 437 MacCorkel Ave., South Charleston 3, W.Va. (Corp. M. Jan. '44)

**Card, S. L.,** *see* Ambridge Water Dept.

**Carl, Charles Elard,** Public Health Engr., Jackson County Health Dept., Independence, Mo. (Jan. '43) ★

**Carl, Kenneth J.,** Engr., National Board of Fire Underwriters, 46–03 Four Mile Run Drive, Arlington, Va. (Oct. '41)

**Carlisle, O. B.,** Engr. of Water Works Design, 402 City Hall, Chicago 2, Ill. (Apr. '41) *M*

**Carlson, Axel,** Water Supt., Ketchikan Public Utilities, Ketchikan, Alaska (Apr. '40)

**Carlson, A. H.,** *see* East Helena, City of

**Carlson, E. T.,** Supt., City Water Dept., Box 2208, Sarasota, Fla. (Jan. '41)

**Carlton, Frank,** Sales Engr., Lohman Bros., Inc., 1449 S. San Pedro St., Los Angeles, Calif. (Oct. '39)

**Carlton, Leland Gardner,** Supt., Munic. Water Works, City Hall, Springfield 3, Mass. (July '41) *M*

**Carman, Simon P.,** *see* Binghamton Bureau of Water

**Carmichael, David W.,** Director of Public Utilities, Municipal Bldg., Verona, N.J. (Oct. '39) *M*

**Carmien, R. P.,** Coast Agent, Golden-Anderson Valve Specialty Co., 1800 Canyon Drive, Los Angeles, Calif. (Oct. '34)

**Carney, Harry W.,** Head Clerk, Bureau of Water Works & Supply, 207 S. Broadway, Los Angeles, Calif. (Jan. '43)

**Carns, James G., Jr.,** Mgr., Bristol County Water Co., Bristol, R.I. (Oct. '35)

**Carolina Aluminum Co.,** A. J. Rice, Asst. Property Supt., Badin, N.C. (Corp. M. Nov. '24)

**Carolina Beach, Town of,** Herbert M. Biddle, Supt. of Water & Sewer, Carolina Beach, N.C. (Corp. M. Oct. '42)

**Carollo, John A.,** Constr. Engr., Headman, Ferguson & Carollo, 319 Homebuilders Bldg., Phoenix, Ariz. (Jan. '39)

**Carothers, Chas. H.,** 2490—32nd St., Miami 37, Fla. (Jan. '44)

**Carpenter, Chas.,** Gen. Supt., Southland Paper Mills, Inc., Lufkin, Tex. (Apr. '42)

**Carpenter, George,** Supt., Water Dept., Municipal Water Bldg., Ithaca, N.Y. (Jan. '35) *MP*

**Carpenter, W. N.,** Supt., La Canada Irrigation Dist., Box 162, La Canada, Calif. (Oct. '38)

**Carper, W. H.,** City Mgr., Clifton Forge, Va. (Apr. '43) *AM*

**Carr, J. A.,** Supt., Village Water Dept., Ridgewood, N.J. (May '16) *Fuller Award '42. Director '44–'47. AM*

**Carrillo, Oswaldo Ruiz,** Civ. Engr., Instituto Nacional de Obras Sanitarias, Ministerio de Obras Publicas, Div. de Analisis de Aguas, Caracas, Venezuela, S.A. (Jan. '44)

**Carroll, Eugene,** Vice-Pres. & Mgr., Butte Water Co., Butte, Mont. (June '04) *Director '30–'31. Fuller Award '43.*

**Carroll, Hugh J.,** Engr. of Water Extension, City Hall, Yonkers, N.Y. (Apr. '31)

**Carroll, John J.,** Neptune Meter Co., 5255 Carrollton Ave., Indianapolis 5, Ind. (Jan. '38) *M*

**Carson, H. Y.,** *see* Carson-Cadillac Corp.

**Carson-Cadillac Corp.,** H. Y. Carson, Pres., Box 67, Tarrant Branch, Birmingham 7, Ala. (Assoc. M. Jan. '37)

**Cartan, Henry,** *see* Suburban Water Co. (San Francisco)

**Carter, Earl L.,** Cons. Engr., 910 Electric Bldg., Indianapolis 4, Ind. (Dec. '32)

**Carter, Gerald R.,** Assoc. Engr., Marion L. Crist & Assoc., Union Life Bldg., Little Rock, Ark. (Apr. '44) *P*

**Carter, H. E.,** Gen. Mgr., Crescenta Mutual Water Co., Box 63, Verdugo City, Calif. (July '35) *M*

**Carter, K. M.,** Mgr., Federal Equipment Co., 155 King St., Chatham, Ont., Can. (Apr. '42)

**Carty, J. V.,** Secy., Ohio Water Service Co., 235 State St., Struthers, Ohio (Jan. '36) *A*

**Carver, Andy J.,** Utilities Supt., Clinton Naval Air Station, 500 N. Ninth St., Clinton, Okla. (Oct. '43)

**Carver, Leon A.,** Civ. Engr., Naval Air Station, Clinton, Okla. (Oct. '43)

**Cary, E. S.,** Supt. of Water Works, Evansville, Wis. (Oct. '35)

**Cary, William H., Jr.,** 2106 Ross Rd., Rosemary Hills, Silver Spring, Md. (July '42) *P*

**Casad, Charles C.,** Supt., Water Dept., City Hall, Bremerton, Wash. (Jan. '26) *Fuller Award '43. M*

**Casad, Orla,** Supt. of Water Works, Box 624, Merced, Calif. (Nov. '24)

**Case, Boyd,** Mgr., Water Works Dept., Bowling Green, Ohio (Apr. '44)

**Case, E. W.,** Supt., Water Works, Newport, Ore. (Affil. Jan. '39)

**Case, Egbert D.,** Vice-Pres., The Pitometer Co., 50 Church St., New York 7, N.Y. (Mar. '21) *Director '32–'35.*

**Case, W. D.,** Case Engineering Co., 457 N. Kingshighway, St. Louis 8, Mo. (July '42) *P*

**Caspar, Ferdinand E.,** City Engr., Water Dept., City Hall, Orange, N.J. (Apr. '43) *MP*

**Cassidy, Edwin J.,** Supt., Wayne Township Water Dept., Municipal Bldg., Mountain View, N.J. (July '41)

**Cassidy, H. James,** Civ. Engr. Assoc., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (July '36) *M*

**Caster, Arthur D.,** 554 Meadoway Park, Worthington, Ohio (Jan. '42) *MP*

**Castilla, J. A.,** Mech. Engr., Ave. Madero 70 Desps. 103/104, Mexico, D.F., Mexico (Apr. '43)

**Caswell, H. H.,** *see* Ann Arbor Water Dept.

**Catanese, Santi J.,** Asst. Engr., Bureau of Water Supply, 2030 Penrose Ave., Baltimore 23, Md. (Oct. '42) *M*

**Cates, Walter H.,** Western Pipe & Steel Co., 153 Sierra View Rd., Pasadena 2, Calif. (Sept. '31)

**Cattell, Everett D.,** Supt., Water Distr., 515 Water St., Jackson, Mich. (Jan. '41) *M*

**Catton, W. R.,** Mgr., Public Utilities Com., Brantford, Ont., Can. (Apr. '42)

**Cazier, Marvin,** Supt. of Water Distr., 1100 S. Main St., Decatur 16, Ill. (Jan. '44)

**Cecil, Lawrence K.,** 732 Kennedy Bldg., Tulsa 3, Okla. (Jan. '28) *P*

**Cedar Rapids City Water Works,** H. F. Blomquist, Supt., City Hall, Cedar Rapids, Iowa (Corp. M. Jan. '36)

**Celanese Corp. of America,** Arthur G. Fowler, Engr., Water Dept., Cumberland, Md. (Corp. M. Jan. '43)

**Central Foundry Co., The,** R. F. Garcia, 386 Fourth Ave., New York 16, N.Y. (Assoc. M. June '03)

**Central Power & Light Co.,** George A. Mills, Supt., Water Dept., Corpus Christi, Tex. (Corp. M. July '36)

**Centralia City Water Dept.,** Emil F. Jayne, Centralia, Ill. (Corp. M. Oct. '41)

**Centriline Corp.,** H. Seaver Jones, Pres., 140 Cedar St., New York, N.Y. (Assoc. M. Jan. '40)

**Chadwick, H. M.,** Box 2170, Denver 1, Colo. (Jan. '41)

**Chain Belt Co.,** R. T. Steindorf, Sales Mgr., Conveyor & Process Equipment Div., 1600 W. Bruce St., Milwaukee 4, Wis. (Assoc. M. Apr. '41)

**Chalmers, G. H.,** Engr., The Canada Ingot Iron Co., Ltd., Guelph, Ont., Can. (Apr. '43)

**Chamberlain, L. H.,** Eastern Dist. Mgr., American Well Works, 475 Fifth Ave., New York 17, N.Y. (Jan. '24) *P*

**Chamberlin, M. E.,** Chief Engr., Corwin & Co., Medical Arts Bldg., Great Falls, Mont. (Apr. '44)

**Chamberlin, Noel S.,** San. Chemist, Technical Service Div., Wallace & Tiernan Co., Inc., Newark 1, N.J. (Jan. '42) *Goodell Prize '44. P*

**Chambers, Grover,** Water Supt., Cheney, Wash. (Apr. '38) *MP*

**Champ, Wm. T.,** Supt., Village of Sherburne, N.Y. (Jan. '39)

**Chandler, R. B.,** Mgr., Public Utilities Com., Public Utilities Bldg., Port Arthur, Ont., Can. (Jan. '43) *M*

**Chandler, R. Baker,** Water Supt., Clarksville, Va. (July '43) *M*

**Chandley, Harry B.,** Mgr., Beaver Falls Munic. Authority, 1425—8th Ave., Beaver Falls, Pa. (Jan. '41) *M*

**Chaney, Howard E.,** 103 Gay St., Cambridge, Md. (Jan. '44) *MP*

**Chaney, Lee F.,** Chemist, Public Service Co. of Colorado, Box 79, Boulder, Colo. (Apr. '44) *P*

**Chanlett, Emil T.,** 434 Bronx Park Ave., New York 60, N.Y. (Apr. '42) ★

**Chapin, Carl K.,** Admin. Secy., Retirement Board, Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '29)

**Chapman, F. W.,** Greenwood, S.C. (Dec. '25) *M*

**Chapman Valve Mfg. Co.,** Donald M. Belcher, 203 Hampshire St., Indian Orchard, Mass. (Assoc. M. Apr. '84)

**Chapman, W. Frank,** Town Mgr., Salem, Va. (Jan. '44)

**Chapton, Herbert J.,** Water Works Engr., Bureau of Water Works & Supply, Box 3669 Terminal Annex 54, Los Angeles, Calif. (Oct. '37)

**Charles, Robert S., Jr.,** Field Supt., International Water Supply, Ltd., 107 Windsor Ave., London, Ont., Can. (Jan. '36)

**Charleston Comrs. of Public Works,** 14 George St., Box 829-A, Charleston, S.C. (Corp. M. May '12)

**Charlottesville, City of,** Box 198, Charlottesville, Va. (Corp. M. Jan. '44)

**Charlton, David B.,** Charlton Labs., Box 1048, Portland 7, Ore. (Jan. '38) *P*

**Chase Brass & Copper Co., Incorporated,** 236 Grand St., Waterbury, Conn. (Assoc. M. Mar. '29)

**Chase, Douglas E.,** Mgr., Munic. Authority of Borough of West View, 516 Lincoln Ave., Bellevue, Pittsburgh 2, Pa. (Jan. '43)

**Chase, E. Sherman,** Cons. Engr., Metcalf & Eddy, Engrs., 1300 Statler Bldg., Boston 16, Mass. (May '19) *Director '44–'47. P*

**Chase, George E.,** Mgr., Public Utilities Com., Bowmanville, Ont., Can. (Sept. '33) *M*

**Chase, H. Percival,** Sales Mgr., Mefford Chemical Co., 1026 Santa Fe Ave., Los Angeles 21, Calif. (Jan. '41)

**Chase, H. W.,** Supt. of Water Works, Colfax, Wash. (Apr. '39)

**Chase, Horace H.,** Box 252, Sandwich, Mass. (May '24)

**Chase, Walter H.,** Supt., Mystic Valley Water Co., Mystic, Conn. (July '40)

**Chateaugay Water Works Co.,** O. S. Johnston, Pres., Chateaugay, N.Y. (Corp. M. Oct. '41)

**Chatham Board of Water Comrs.,** T. M. S. Kingston, Mgr.-Engr., Chatham, Ont., Can. (Corp. M. Feb. '24)

**Chem-Feeds, Inc.,** Jeff Corydon, Pres., Equipment & Proportioning Dept., 77 Reservoir Ave., Providence 7, R.I. (Assoc. M. Apr. '43)

**Chemical Process Co.,** G. F. Mills, Research Director, 563 Second St., San Francisco 7, Calif. (Assoc. M. Oct. '43)

**Chenal, William J.,** Engr., Cincinnati Water Works, 3521 Schwartze Ave., Cincinnati 11, Ohio (Apr. '42)

**Chenery, Charles M.,** Pres. & Treas., New York Water Service Corp., 90 Broad St., New York 4, N.Y. (Apr. '40) *M*

**Chenery, Christopher T.,** Pres., Federal Water Service Corp., 90 Broad St., New York 4, N.Y. (June '26)

**Cheshire, H. E.,** Jr. Engr., State Health Dept., Charleston 5, W.Va. (Affil. Jan. '42) ★

**Chester, Burke,** Sr. San. Officer, Lake County Health Dept., Travares, Fla. (Jan. '44) *P*

**Chester, J. N.,** The Chester Engrs., 210 E. Park Way, N.S., Pittsburgh, Pa. (Nov. '10) *Fuller Award '44. MP*

**Chevalier, Willard,** Vice-Pres., McGraw-Hill Publishing Co., Publisher, *Business Week*, 330 W. 42nd St., New York 18, N.Y. (June '34) *Goodell Prize '34. Director '37–'40.*

**Chicago Bridge & Iron Co.,** George T. Horton, Pres., 1305 W. 105th St., Chicago 43, Ill. (Assoc. M. June '08)

**Chicago Pump Co.,** L. P. Blattner, 2336 Wolfram St., Chicago 18, Ill. (Assoc. M. Jan. '40)

**Chick, Henry M.,** Lt., San. Corps, Headquarters, M.R.T.C., Camp Barkeley, Tex. (Jan. '43) ★

**Chiene,. Walter S.,** Dist. Mgr., Peoples Water & Gas Co., Marshfield, Ore. (July '35)

**Chihuahua, Junta Central de Aguas del Estado de,** Francisco C. Holguin, Pres., Chihuahua, Mexico (Corp. M. May '44)

**Childs, C. S.,** *see* Flox Co., Inc.

**Childs, Fred S.,** 88 Union Ave., Clifton, N.J. (May '30)

**Chillicothe Munic. Utilities,** A. E. Cox, Mgr., Chillicothe, Mo. (Corp. M. July '42)

**Chinn, Keith R.,** Plant Supt., West Palm Beach Water Co., Box 1331, West Palm Beach, Fla. (Feb. '27) ★

**Chorney, Paul A.,** Supt., Ogdensburg Boro Water Dept., Ogdensburg, N.J. (Jan. '36) ★

**Christensen, A. Lee,** 1774 Princeton Ave., Salt Lake City 5, Utah (Jan. '44) *P*

**Christensen, C. O.,** Christensen Plumbing & Heating, 510 N. 24th St., Billings, Mont. (Jan. '44)

**Christiansen, Lars E.,** Foreman, Metropolitan Water Dist., 5946 Great Oak Circle, Los Angeles 42, Calif. (Oct. '43) *M*

**Christie, H. B.,** 1016 Minerva Ave., Durham, N.C. (Oct. '42)

**Christopher, J. B.,** Supt., Warres-n burg & Pertle Spring Water Co., 105 Grover St., Warrensburg, Mo. (July '35) *M*

**Christy, Clyde V.,** Water Supt., Warrenton, Ore. (Apr. '42)

**Chubb, Robert S.,** City Engr., 1318 Carbon St., Reading, Pa. (May '30)

**Church, Dean F.,** Supt. of Water & Sewage Plant, St. James, Minn. (Jan. '43) *P*

**Chute, W. M.,** Water Works Supt., Wheatley, Ont., Can. (Apr. '34) *M*

**Cihak, Joseph F., Jr.,** Township Supervisor, 1990 Apple Ave., Muskegon, Mich. (Oct. '42)

**Cissna, Geo. W.,** Salesman, Neptune Meter Co., 254 Spring St., Atlanta 3, Ga. (July '35)

**Citizens Utilities Co.,** F. A. Merfeld, Dist. Mgr., Wallace, Idaho (Corp. M. Apr. '38)

**Citizens Water Supply Co. of Newtown,** *see* Newtown

**Clack, R. G.,** Supt., Munic. Water Dept., 203 N. 3rd St., Durant, Okla. (Jan. '43) *P*

**Claflin, Charles R.,** Supt., Water Co., Rensselaer, N.Y. (Sept. '19) *M*

**Claggette, Arthur D.,** Supt., Dept. of City Utilities, Barberton, Ohio (Jan. '40)

**Clapp, Milton, Jr.,** Chemist, 237 Tranquil Ave., Charlotte, N.C. (Jan. '36)

**Clapper, Merle H.,** *see* Delavan Water Com.

**Clare, H. C.,** *see* Idaho Dept. of Public Health

**Clark, Arthur T.,** Secy.-Mgr., Water & Sewage Works Manufacturers Assn., 12 E. 41st St., New York 17, N.Y. (May '19)

**Clark, Bradford N.,** San. Engr., 1822 Lamberts Mill Rd., Westfield, N.J. (Oct. '42) *P* ★

**Clark, Dennis H.,** Supt., West Virginia Water Service Co., Welch, W.Va. (Jan. '39)

**Clark, Elizabeth V.,** *see* Merritton Public Utilities Com.

**Clark, Eugene S.,** Div. of San. Eng., State Dept. of Public Health, Springfield, Ill. (July '35) *P*

**Clark, Everett L.,** Sr. Utils. Engr., California Railroad Com., 708 State Bldg., Los Angeles 12, Calif. (Oct. '39) *M*

**Clark, H. C.,** Supt., Board of Public Works, City Hall, Hillsdale, Mich. (Jan. '38) *M*

**Clark, H. W., Co.,** Box 563, Mattoon, Ill. (Assoc. M. May '08)

**Clark, Horace L.,** Supt., Sanford Water Dist., Sanford, Me. (Apr. '30) *M*

**Clark, J. C.,** Supt., Water Dept., City Hall, Lubbock, Tex. (Oct. '43) *M*

**Clark, Joseph R.,** Asst. Engr. (R), c/o Bureau of Engineering, State Dept. of Health, Lansing 4, Mich. (Apr. '44)

**Clark, Lloyd K.,** Director, Div. of San. Eng., State Dept. of Health, Bismarck, N.D. (Jan. '39) ★

**Clark, M. S.,** Salesman, Mathieson Alkali Works, Inc., 1853 E. Beardsley Ave., Elkhart, Ind. (Apr. '37)

**Clark, Owen E.,** Constr. Engr., Div. of Water, 110 Cherry St., Toledo 4, Ohio (Oct. '38) *P*

**Clark, Seymour H.,** Supt. of Water Dept., 114 Washington Ave., Oneida, N.Y. (Jan. '40) *MP*

**Clark, William George,** Cons. Engr., 2721 Scottwood Ave., Toledo 10, Ohio (July '08)

**Clark, William H.,** Supt., Water Works, Avon, N.Y. (May '16)

**Clarke, Samuel M.,** Greeley & Hansen, 6 N. Michigan Ave., Chicago 2, Ill. (Oct. '41)

**Clarkson, L. M.,** State Dept. of Public Health, Atlanta 3, Ga. (Aug. '29) *P*

**Classon, W. Guy,** Supt. & Registrar, Leominster Water Works, Leominster, Mass. (June '31)

**Clay, Joe,** Supt., Carlisle Water Works, Carlisle, Ky. (Jan. '24)

**Clay, John W.,** Supt., Water Dept., 11 City Hall, 2nd & Main Sts., Alhambra, Calif. (Oct. '37)

**Clayton, Harry H.,** Mgr., Water & Sewage Dept., Lewisville, Ark. (Apr. '43) *M*

**Clayton Mfg. Co.,** 1812 Lemon St., Alhambra, Calif. (Assoc. M. Oct. '39)

**Clayton, Nelson J.,** Supt., Pottsville Water Co., 221 Centre St., Pottsville, Pa. (Mar. '25)

**Cleary, E. J.,** *see Engineering News-Record*

**Clemens, John D.,** *see* Hays Mfg. Co.

**Clement, Russell C.,** 75 Overlook Terrace, Bloomfield, N.J. (July '35) *P*

**Cleminson, J. E.,** 630 S. Tyler, El Monte, Calif. (July '35)

**Cleveland, E. A.,** Chief Comr., Greater Vancouver Water Dist., 1303 Bekins Bldg., Vancouver, B.C., Can. (Mar. '24)

**Cleveland, Firley C.,** Supt., Southern California Water Co., 9614 Culver Blvd., Culver City, Calif. (Apr. '43) *M*

**Cleverdon, Walter S. L.,** 33 Deshon Ave., Bronxville 8, N.Y. (Apr. '16)

**Clewiston, City of,** E. E. Gross, Engr., Electric & Water Works System, Clewiston, Fla. (Corp. M. Oct. '42)

**Cliffs Dow Chemical Co.,** V. G. Holliday, Marquette, Mich. (Assoc. M. Apr. '38)

**Clifton, Charles Elmer,** Chemist, Cannon Bldg., Troy, N.Y. (Mar. '10) *P*

**Clinton Public Utilities,** A. E. Rumball, Supt., Water Works, Clinton, Ont., Can. (Corp. M. Apr. '44)

**Clogher, A. C.,** *see* Ebasco Services, Inc.

**Clot, Henry,** Topographical Draftsman, Bureau of Water Works & Supply, 2630 Maceo St., Los Angeles, Calif. (Apr. '38)

**Clough, Frank** *see* South Pasadena, City of

**Clouser, L. H.,** Prin. San. Engr., Tennessee Valley Authority, 502 Union Bldg., Knoxville, Tenn. (July '37) *MP*

**Clow, James B., & Sons,** Kent S. Clow, 201 N. Talman Ave., Chicago 80, Ill. (Assoc. M. Apr. '85)

**Clow, Kent S.,** *see* Clow, James B., & Sons

**Cloyes, W. J.,** Sanitarian, Lane County Health Dept., Courthouse, Eugene, Ore. (Affil. Jan. '43) *P*

**Coates, G. N.,** Supt., Water Dept., 518 Taaffe St., Sunnyvale, Calif. (Apr. '30)

**Coates, John James,** c/o Sheppard T. Powell, Chem. Engr., 330 N. Charles St., Baltimore, Md. (Jan. '38)

**Cobleigh, W. M.,** Dean Emeritus of Eng., Montana State College, Bozeman, Mont. (May '33) *Fuller Award '41.*

**Coburn, James W.,** Treas., Consumers Water Co., Box 151 Pearl St. Station, Portland 6, Me. (Feb. '23)

**Coca-Cola Co., The,** Bert H. Wells, Chemist, Chem. Control Dept., Drawer 1734, Atlanta 1, Ga. (Corp. M. Oct. '41)

**Cochran, L. R.,** *see* Baldwin Park County Water Dist.

**Cochran, Wm. D.,** Pres. & Gen. Mgr., Maysville Water Co., Maysville, Ky. (July '42) *M*

**Cochrane, John C.,** Wallace & Tiernan Co., Inc., Box 178, Newark 1, N.J. (July '35) *P*

**Coe, Glen F.,** Mgr., Secy. & Treas., Dixon Water Co., 121 E. 1st St., Dixon 1, Ill. (May '30)

**Coe, M. A.,** 614 Tewkesbury Pl. No. 10, Washington, D.C. (Jan. '44) ★

**Coey, John S.,** *see* Hooker Electrochemical Co.

**Coffman, D. G.,** Water Supt., 1417 Washington St., Sumner, Wash. (Apr. '39)

**Coger, W. D.,** Supt., West Virginia Water Service Co., Weston, W.Va. (Affil. Jan. '42) *M*

**Colbeck, S. C.,** *see* Pittsburgh Coke & Iron Co.

**Coldiron, Robert P.,** Plant Engr., City Water Works, Box 346, Danville, Ky. (July '41) *MP*

**Cole, A. B., Sr.,** Water, Sewer, Street & Park Supt., Box 826, Midland, Tex. (Oct. '39)

**Cole, B. G.,** Chemist, Water Purif. Plant, Monroe, La. (Oct. '39) *MP*

**Cole, Chas. W.,** Cons. Engr., 220 W. La Salle St., South Bend, Ind. (Oct. '38)

**Cole, E. Shaw,** Engr., 21 Erwin Park Rd., Montclair, N.J. (Oct. '38)

**Cole, Edward S.,** Pres., The Pitometer Co., 50 Church St., New York 7, N.Y. (June '02)

**Cole, Marvin,** Supt. of Water Works, 1405 Otley Ave., Perry, Iowa (Apr. '36) *MP*

**Cole, Thomas A.,** Bacteriologist & Supt. of Filtration, 172 Mansion Sq., Poughkeepsie, N.Y. (Jan. '35) *P*

**Coleman, Robert Feaster, Jr.,** Teaching Fellow, North Carolina State College, Box 5403, State College Station, Raleigh, N.C. (Jr. M. July '41) ★

**Coleman, Thomas W.,** Asst. Mgr., Commonwealth Water Co., 13 Beechwood Rd., Summit, N.J. (Jan. '44) *M*

**Coles, L. Dudley,** Chief Engr., Dept. of Public Works, City Hall, Newark 2, N.J. (July '43)

**Collar, Ira T., Jr.,** Dist. Mgr., Neptune Meter Co., 2107 Grand Ave., Kansas City, Mo. (Oct. '38)

**Collar, Ira T., Sr.,** Mfr.'s Sales Repr., 1913 Tauromee Ave., Kansas City 2, Kan. (Apr. '44) *P*

**Collier, F. E.,** Supt., Munic. Water Works, 253 Broad St., Cookeville, Tenn. (Apr. '26) *M*

**Collier, Meredith,** Supt. of Constr. & Distr., Atlanta Water Works, 646 Hemphill Ave., N.W., Atlanta 3, Ga. (Jan. '41)

**Collings, William E.,** Supt., Borough of Collingswood, 713 Lees Ave., Collingswood, N.J. (Oct. '38)

**Collins, Charles E.,** Assoc. San. Engr., 1200 Pine St., Kilgore, Tex. (Oct. '39)

**Collins, Fred C.,** Water Plant Supt., Walnut Irrigation Dist., 2701 Passons Blvd., Rivera, Calif. (July '42)

**Collins, R. E.,** Southwest Repr., Box 914, Donna, Tex. (Jan. '44)

**Collins, Rex,** Collins Engineering Co., 326 Arnote Bldg., McAlester, Okla. (Jan. '44)

**Collins, W. D.,** Chemist, U.S. Geological Survey, Washington 25, D.C. (Dec. '25) *P*

**Collyer, William I.,** *see* White Plains Dept. of Public Works

**Colston, Robert,** 53 W. Jackson Blvd., Chicago 4, Ill. (Apr. '41)

**Coltart, Rodney F.,** San. Engr., 632 Leverington Ave., Roxborough, Philadelphia, Pa. (Jan. '42)

**Colton, Dudley T.,** Engr., Transite Pipe & Shingle Div., Johns-Manville Research Lab., Manville, N.J. (July '43) *M*

**Columbia Chemical Div.,** Pittsburgh Plate Glass Co., R. W. Miller, Technical Service Dept., Barberton, Ohio (Assoc. M. Jan. '39)

**Columbia, J. Z.,** Chemist, Filter Plant, Langeloth Water Co., R.D. No. 3, Burgettstown, Pa. (Apr. '40) *P*

**Comin, James E.,** 3192 Park Ave., Memphis, Tenn. (Oct. '43)

**Community Water Service Co.,** Geo. W. Biggs Jr., Pres., 50 Broad St., New York, N.Y. (Corp. M. Jan. '27)

**Compton, Harold E. T.,** Chief Engr., United Filters & Eng., Ltd., "Pertenhall," Mayfield Ave., Orpington, Kent, England (Jan. '39)

**Comstock, C. D.,** Supt., Sodus Point Water Works, Sodus Point, N.Y. (Apr. '39) *P*

**Conard, William R.,** Engr. & Consultant, 321 High St., Burlington, N.J. (June '04) *Honorary M. '43.*

**Concord Board of Light & Water Comrs.,** T. O. Sills, Water Comr., 467 Harris St., Concord, N.C. (Corp. M. Apr. '43)

**Condrey, Lawrence M.,** Structural Engr., Portland Cement Assn., 611 Merchants Bank Bldg., Indianapolis, Ind. (Apr. '44)

**Conk, Robert H.,** Chemist & Bacteriologist, West Palm Beach Water Co., 416 Biscayne Drive, West Palm Beach, Fla. (Apr. '31) ★

**Conkling, Harold,** Deputy State Engr., State Div. of Water Research, Box 1079, Sacramento 5, Calif. (Oct. '39)

**Conlan, James F.,** 196 Madison Rd., Scarsdale, N.Y. (Apr. '34)

**Connell, C. H.,** 4711 Sinclair Ave., Austin 21, Tex. (Jan. '38) *P* ★

**Connell, H. P.,** Pres. & Gen. Mgr., Baton Rouge Water Works Co., Box 2391, Baton Rouge 6, La. (Jan. '39) *M*

**Connell, Maurice H.,** Sr. Partner, Maurice H. Connell & Assoc., Langford Bldg., Miami, Fla. (July '42)

**Connelly, John J.,** Comr., Passaic Valley Water Com., 800 Bloomfield Ave., Clifton, N.J. (Oct. '43)

**Connerly, Arthur R.,** Supt., Box 708, Lake Village, Ark. (Jan. '43)

**Connolly, Joel I.,** Asst. to Pres., Board of Health, Chicago 10, Ill. (June '30)

**Connor, C. M.,** Technical Director, Valley Forge Labs., Inc., Balligomingo Rd., West Conshohocken, Pa. (Jan. '38)

**Connor, F. J.,** 221 N. Spring Ave., Sioux Falls, S.D. (May '00)

**Connor, James W.,** Chief Clerk, City Water Bureau, City Hall, Camden, N.J. (Oct. '43)

**Connors, Joseph J.,** 2138 Center St., Berkeley 4, Calif. (Oct. '42) *P*

**Conrad, Wm. F.,** Supt. of Water Dept., City Hall, Bicknell, Ind. (Oct. '40) *M*

**Consoer, Arthur Wardell,** Consoer, Townsend & Quinlan, 211 W. Wacker Drive, Chicago, Ill. (July '39)

**Consolidated Chemical Industries, Inc.,** A. P. Jones, 640 Mellie Esperson Bldg., Houston 2, Tex. (Assoc. M. July '35)

**Consolidated Steel Corp., Ltd.,** W. H. McClara, Box 6880, East Los Angeles Branch, Los Angeles 22, Calif. (Assoc. M. Oct. '40)

**Converse, J. B.,** Pres., J. B. Converse & Co., Inc., Box 1084, Mobile 6, Ala. (Jan. '42)

**Cook, A. D., Inc.,** C. O'Brien, Pres., Lawrenceburg, Ind. (Assoc. M. June '14)

**Cook, A. E.,** Mgr., Narbonne Ranch Water Co. No. 2, Box 92, Lomita, Calif. (Jan. '41)

**Cook, Frederick S.,** Pacific Coast Mgr., Robert W. Hunt Co., 251 Kearny St., San Francisco 8, Calif. (Oct. '37) *M*

**Cook, H. M.,** Supt., City Pumping Station, Batavia, N.Y. (Apr. '37) *P*

**Cook, Ivory I.,** Supt., Water Plant, 1443 Franklin St., Columbus, Ind. (Apr. '41)

**Cook, James R.,** Cons. Engrs., C.A., Apartado 168, Caracas, Venezuela, S.A. (Jan. '37)

**Cook, John H.,** Governor, Society for Establishing Useful Manufactures, 72 McBride Ave., Paterson, N.J. (July '06)

**Cook, Lawrence H.,** Civ. Engr., Box 696, Menlo Park, Calif. (Jan. '29)

**Cook, Loy E.,** Supt., Madera Water Works, 220 S. I St., Madera, Calif. (Oct. '39)

**Cook, Paul D.,** Lake County San. Engr., Courthouse, Painesville, Ohio (Mar. '34) ★

**Cook, Will W.,** Advisory Engr., 546 N. 79th St., Seattle 3, Wash. (Apr. '38) *P*

**Cook, William J. M.,** Chief Chemist, Neckar Water Softener Co., Ltd., Artillery House, Artillery Row, London, S.W. 1, England (June '34)

**Cooke, R. R.,** Gen. Foreman, City Water Works, 701 Bourbon St., Dallas, Tex. (July '43)

**Cooper, Geo. W.,** Vice-Pres. & Gen. Mgr., Monterey Bay Water Co., Box 801, Santa Cruz, Calif. (Oct. '43) *M*

**Cooper, Gerald S.,** Assoc. Engr. of Distr. Design, Dept. of Water & Power, 207 S. Broadway, Los Angeles 12, Calif. (Oct. '43) *M*

**Cooper, Hilton H., Jr.,** Assoc. Engr., U.S. Geological Survey, Box 631, Tallahassee, Fla. (July '43)

**Cooper, J. E.,** Medical Dept., Ford Motor Co., Dearborn, Mich. (July '40) *MP*

**Cooper, M. B.,** Supt., Canal & Water Works, Augusta, Ga. (May '33)

**Coote, Richard,** Chemist, Dept. of Water Works, 532 Franklin St., Michigan City, Ind. (Oct. '39) *P*

**Copeland, Ross A.,** Supt., Pipe Constr., Los Angeles Dept. of Water & Power, 6676 Franklin Ave., Los Angeles 28, Calif. (Oct. '30)

**Copley, John G.,** *see* Elmira Water Board

**Copper & Brass Research Assn.,** Arthur I. Heim, 420 Lexington Ave., New York 17, N.Y. (Assoc. M. Aug. '23)

**Corbalis, James J., Jr.,** San. Engr., Fairfax County, Fairfax, Va. (Apr. '42) *M*

**Corbin, Malcolm D.,** Sr. Engr., Water Div., Office of War Utilities, War Production Board, 2001—37th St., S.E., Washington 20, D.C. (Apr. '43)

**Corcoran, Harry J.,** Engr., Iowa Insurance Service Bureau, 414 Insurance Exchange Bldg., Des Moines 9, Iowa (Jan. '34)

**Cordle, Thomas Llewellin,** Cons. Engr., 2726 Willow Drive, Charlotte 4, N.C. (Jan. '43) *AMP* ★

**Corey, R. H.,** Cons. Engr., 407 Corbett Bldg., Portland 4, Ore. (June '20) *MP*

**Corin, Magnus F.,** Chemist, 511 Hansberry St., Germantown, Philadelphia, Pa. (Apr. '10)

**Corine, George A.,** Gen. Supt., Water, Light & Power Co., Superior, Wis. (Oct. '24)

**Corle, V. B.,** Supt., Gettysburg Water Co., Gettysburg, Pa. (Oct. '43) *MP*

**Cormier, Clyde F.,** *see* Preble Water Dept.

**Cornejo, Antonio,** Civ. & San. Engr., Paseo de la Reforma No. 1425, Lomas de Chapultepec, Mexico City, Mexico (Jan. '36)

**Cornelius, Clarence C.,** Supt. of Public Works, 706 Philadelphia Blvd., Sea Girt, N.J. (Oct. '39)

**Cornell, Chas. Brown,** 638 S. Wayne Ave., Columbus 2, Ohio (May '28)

**Cornell, W. M.,** Mgr., Public Utilities Com., 741 Queen St., E., Sault Ste. Marie, Ont., Can. (Jan. '37)

**Corning Water Dept.,** C. F. Wilson, Supt., Corning, N.Y. (Corp. M. Jan. '41)

**Corns, Richard B.,** Supt., City Water Works, Elkhart, Ind. (Jan. '43)

**Corpus Christi, City of,** John W. Cunningham, Water Works Supt., City Hall, Corpus Christi, Tex. (Corp. M. Apr. '39)

**Corr, Ray H.,** Supt. of Water, City Hall, Woodstock, Ill. (Apr. '42)

**Corry, William F.,** *see* Montpelier Water Dept.

**Corson, B. B.,** Mgr., El Dorado Water Co., Inc., El Dorado, Ark. (Jan. '43) *M*

**Corson, Benjamin I.,** Instructor, Camden County Vocational School, 6008 Browning Rd., Merchantville, N.J. (Jan. '41)

**Cortese, J. R.,** Supt., Munic. Water Works, Livingston, Mont. (Mar. '25)

**Corvison, Oscar E.,** Civ. Engr., F No. 614, Vedado, Havana, Cuba (Jan. '42)

**Cory, J. C.,** Pres., Cory Engineering Co., Box 637, Miles City, Mont. (Jan. '44) *P*

**Corydon, Jeff,** *see* Chem-Feeds, Inc.

**Cosculluela, Juan A.,** Cons. Engr., Calle Linea No. 612, (Altos), Vedado, Havana, Cuba (Oct. '13) *Director '41. P*

**Costello, Charles Vincent,** Chief Filter Operator, Bureau of Water, 305 Court St., Binghamton, N.Y. (Affil. Jan. '41) ★

**Costello, John, Jr.,** Outside Supervisor, Dept. of Water, 122 Deeds Ave., Dayton 4, Ohio (July '42) *M*

**Couch, L. I.,** Cons. Engr., 227 W. Edwards Ave., Indianapolis 44, Ind. (Jan. '44) *P*

**Coughlan, R. E.,** Engr. of Tests, Chicago & Northwestern Ry. System, 4200 W. Kinzie St., Chicago 24, Ill. (Feb. '23) *P*

**Coughlen, Harry G., Jr.,** Asst. Supt. of Pumping, Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Jan. '37) *M*

**Coughlin, L. J.,** 980 Edgehill Rd., San Bernardino, Calif. (Oct. '38) *M*

**Coupal, Roy E.,** City Bacteriologist, Water Dept., Box 606, Eureka, Calif. (Jan. '40) *P*

**Courtney, William M.,** Supt., Santa Ana River Water Co., Box 46, Mira Loma, Calif. (Apr. '43) *P*

**Cousins, J. E., Jr.,** Southern Repr., Layne-Atlantic Co., Box 2431, Orlando, Fla. (July '38) *M*

**Covell, Earl Dwight,** Resident Engr., Greeley & Hansen, 522 W. Washington St., Suffolk, Va. (Jan. '44)

**Covington, City of,** James J. Banta, Supt., Light & Water Plant, City Hall, Covington, Ind. (Corp. M. Apr. '43)

**Cowan, John G.,** Jr. Civ. Engr., 532 W. 42nd Pl., Los Angeles, Calif. (Jan. '41) ★

**Cowan, Walter G.,** *see* Ruberoid Co.

**Cowham, Glenn W.,** 123 W. 5th St., Montgomery, Ala. (Jan. '38)

**Cowles, M. Warren,** Health Officer, Hackensack Walter Co., Filtration Plant, New Milford, N.J. (Apr. '19) *MP*

**Cox, A. E.,** *see* Chillicothe Munic. Utilities

**Cox, C. Hurley,** Asst. Right-of-Way Engr., Dept. of Public Works, 301 Municipal Office Bldg., Baltimore, Md. (Oct. '42)

**Cox, Charles R.,** Chief, Bureau of Water Supply, Div. of Sanitation, State Dept. of Health, Albany 1, N.Y. (July '21) *Fuller Award '40. Director '41–'44. P*

**Cox, K. E. (Miss),** Director, State Hygienic Lab., Charleston, W.Va. (July '40)

**Cox, W. P.,** *see* McWane Cast Iron Pipe Co.

**Coy, Burgis G.,** *see* Fort Collins, City of

**Crabbe, B. F.,** 607 First National Bank Bldg., Birmingham 3, Ala. (July '35)

**Crabill, Marshall P.,** Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Dec. '42)

**Crafton, Logan,** Supt., City Water Works, City Hall, Bloomington, Ind. (Jan. '40) *M*

**Craig, Charles P.,** 193 E. Cliff St., Somerville, N.J. (Jan. '42) *P* ★

**Craig, Erwin M.,** Supt., City of Zion, City Bldg., 2800 Elijah Ave., Zion, Ill. (July '41) *M*

**Craig, O. C.,** Clerk, Louisville & Nashville R.R. Co., Sebree, Ky. (July '35)

**Cramer, Clark J.,** Chief Engr., Lexington Water Co., Richmond Pike, R.F.D. No. 5, Lexington, Ky. (July '30) *Director '44–'47. M*

**Cramer, H. Cable,** Mgr., Catlettsburg, Kenova & Ceredo Water Co., Inc., 1309 Chestnut St., Kenova, W.Va. (Jan. '40)

**Cranch, Eugene T.,** Director of Public Works, 304 Eastchester Rd., New Rochelle, N.Y. (Mar. '22) *M*

**Crane Co.,** W. P. Kliment, Standardization Engr., 4100 S. Kedzie Ave., Chicago 5, Ill. (Assoc. M. Jan. '26)

**Crane, D. Elrow,** Supt., City of Columbia Water & Light Dept., Municipal Bldg., Columbia, Mo. (Oct. '43) *M*

**Crane, D. Eugene,** Box 6084 Stockyards Station, Denver, Colo. (Jan. '39) ★

**Crane, D. W.,** Chemist, Chesapeake & Ohio Ry. Co., Columbus 15, Ohio (Jan. '37) *M*

**Crane, H. R.,** *see* Flexible Sewer Rod Equipment Co.

**Crane, Harlan B.,** Civ. Engr.-Repr., Infilco, Inc., 60 E. 42nd St., New York 17, N.Y. (July '43) *P*

**Crane, Harold L.,** Supt., Elizabethtown Water Co., Cons., 9 Wilson Terrace, Elizabeth, N.J. (Oct. '35)

**Crane, Herbert M.,** City Mgr., Cartersville, Ga. (Jan. '41)

**Cranford, W. H.,** Supt. of Water Plant, Rock Hill Printing & Finishing Co., Rock Hill, S.C. (Jan. '39) ★

**Cranston, H. Howard,** Henry H. Cranston & Son, 457 W. Main St., Fredonia, N.Y. (Jan. '40)

**Crase, George H.,** Gen. Sales Mgr., Horton Steel Works, Ltd., 330 Bay St., Toronto 2, Ont., Can. (Jan. '43)

**Crawford, C. G.,** *see* Pelton Water Wheel Co.

**Crawford, Clyde R.,** Supt., Light & Water Dept., Board of Public Affairs, Plymouth, Ohio (Apr. '43) *P*

**Crawford, Russell E.,** Engr., Alvord, Burdick & Howson, 1401 Civic Opera Bldg., Chicago 6, Ill. (Apr. '44) *P*

**Crawford, William H.,** 5013 N. Sydenham St., Philadelphia, Pa. (Jan. '36)

**Creager, William P.,** Cons. Engr., Electric Bldg., Buffalo, N.Y. (July '39)

**Creedmoor, Town of,** J. H. Rogers, Supt., Water Dept., Creedmoor, N.C. (Corp. M. Jan. '43)

**Crenshaw, J. C.,** Asst. Supt., South Pittsburgh Water Co., 238 Brownsville Rd., Pittsburgh, Pa. (July '41) ★

**Crist, Marion L.,** Engr., Marion L. Crist & Assoc., Union Life Bldg., Little Rock, Ark. (Feb. '33) *MP*

**Critchlow, H. T.,** Chief Engr., New Jersey State Water Policy Com., Trenton Trust Company Bldg., Trenton 8, N.J. (Feb. '30) *P*

**Crocker, J. R.,** Dist. Mgr., The Permutit Co., 523 B.M.A. Bldgs., Kansas City 8, Mo. (July '38) *P*

**Crockett, C. L.,** Chemist, Norfolk & Western Ry., Roanoke 12, Va. (Jan. '35) *P*

**Croft, Harry P.,** 208 Maple Ave., Trenton 8, N.J. (Jan. '24)

**Croll, Emiel A.,** 639 Putnam St., Orlando, Fla. (Sept. '93)

**Cromwell, F. R.,** City Engr., Municipal Bldg., Vernon, Tex. (Apr. '43)

**Cronin, H. F.,** Chief Engr., Metropolitan Water Board, 173 Rosebery Ave., London, E.C. 1, England (Jan. '44)

**Crosby, Lathrop,** Asst. Supt., Water Div., 402 City Hall, Tacoma 2, Wash. (Jan. '36)

**Crosier, J. H.,** Sales Engr., 33 University Ave., Rochester 5, N.Y. (Apr. '44)

**Cross, Arthur D.,** *see* Mount Holly Water Co.

**Cross, William P.,** 306 N. Liberty St., Delaware, Ohio (Jan. '40) ★

**Crossan, Thos. E.,** *see* Gulf States Utilities Co.

**Crossett Public Utilities Co.,** R.D. Tucker, Mgr., Crossett, Ark. (Corp. M. Apr. '43)

**Crossman, A. B.,** 3408 Stanford St., Dallas, Tex. (Oct. '39)

**Crothersville Water & Elec. Dept.,** Carl Bridges, Supt., Crothersville, Ind. (Corp. M. Apr. '44)

**Crow, Frank G.,** Gen. Mgr., Water Dept., Florence, Ala. (July '35) ★

**Crow, W. H.,** *see* Monroe, City of

**Crown, Emil J.,** Director of Public Utilities, Cleveland Water Div., 104 City Hall, Cleveland, Ohio (Apr. '43)

**Crownover, M. W.,** Mgr., Westmoreland Water Co., Greensburg, Pa. (July '41)

**Crusoe, Lawrence Evan,** Supt., Lakewood Water Dist., Route 8, Box 674, Tacoma, Wash. (Jan. '44) *M*

**Crutchfield, B. W.,** *see* American Enka Corp.

**Cruthers, Thomas,** *see* Worthington Pump & Machinery Corp.

**Cuba, Cia de Acueducto de, S.A.,** Carlos M. Calvet, Vice-Pres., Gral. Lee 27, Manianao, Havana, Cuba (Corp. M. June '39) *Director '42–'45.*

**Cullen, Bernard W.,** Supt., Water Pipe Extension, 404 City Hall, Chicago 2, Ill. (May '34)

**Culley, Walter M.,** Major, Sn.C., Surgeons Office, 2nd Service Command, Governors Island, N.Y. (Apr. '43) *P* ★

**Culligan, E. J.,** *see* Culligan Zeolite Co.

**Culligan Zeolite Co.,** E. J. Culligan, 1895 Shermer Ave., Northbrook, Ill. (Assoc. M. Apr. '38)

**Culmer, A. B.,** *see* Bellingham Water Dept.

**Culter, L. W.,** 3012 Vincent Rd., West Palm Beach, Fla. (Apr. '34)

**Culver, Robert H.,** ASF Replacement Dept., Camp Reynolds, Greenville, Pa. (Oct. '42) ★

**Cunliffe, Russell W.,** Health Dept., City Hall, Milwaukee, Wis. (Dec. '26)

**Cunningham, John T., Jr.,** City Engr., City Water Dept., Clarksville, Tenn. (Oct. '40)

**Cunningham, John W.,** Supt., Water Dept., Corpus Christi, Tex. (July '30)

**Cunningham, John Wilbur,** Cons. Engr., 414 Spalding Bldg., Portland 4, Ore. (May '29) *P*

**Cunningham, M. B.,** Supt. & Engr., Oklahoma City Water Dept., Oklahoma City 2, Okla. (Oct. '30)

**Currens, Warren W.,** Supt. of Filtration, Passaic Valley Water Com., Box 268, Little Falls, N.J. (Jan. '39) *P*

**Currie, Frank S.,** Mgr., Currie Engineering Co., 219 Anderson Bldg., San Bernardino, Calif. (Apr. '36) *P*

**Curry, W. G.,** Purif. Engr., Southern California Water Co., 1206 S. Maple Ave., Los Angeles, Calif. (Jan. '42)

**Curtis, Wm. E.,** Mgr., Belmont County Water Dist., Belmont, Calif. (July '35)

**Cushing, R. M.,** Designing Engr., Headman, Ferguson, Carollo & Classen, Engrs., 948 Ash Ave., Tempe, Ariz. (July '41) *P*

**Cuthiell, C.,** Supt. of Water Works, Dickson St., Galt, Ont., Can. (Apr. '29)

**Cutler, Ralph W.,** Engr., Western Pipe & Steel Co., 5717 Santa Fe Ave., Los Angeles 11, Calif. (Jan. '41)

**Cutler-Hammer Inc.,** C. S. Pinkerton, Mgr., Public Works & Utilities Sales, 12th St. & St. Paul Ave., Milwaukee 1, Wis. (Assoc. M. Jan. '36)

**Cutler-Magner Co.,** Paul LaLiberte Engr., 1116 Fidelity Bldg., Duluth, Minn. (Assoc. M. Oct. '41)

**Cutter, Howard D., Jr.,** Asst. Chief Engr., South Eastern Underwriters Assn., Box 5048, Atlanta 2, Ga. (Jan. '43)

**Cuzick, W. E.,** *see* West Texas Utilities Co.

**Cyr, Rene,** Asst. Chief San. Engr., Div. of San. Eng., Ministry of Health, 89 Notre Dame St., E., Montreal, Que., Can. (Jan. '34)

**Czarniecki, M. J.,** *see* Byers, A. M., Co.

**Dafoe, A. L.,** Supt., Water Works Dept., Napanee Public Utilities Com., Napanee, Ont., Can. (Feb. '32)

**Dagley, Jack,** Technical Director, Burgess Zeolite Co., Ltd., 72 Horseferry Rd., Westminster, London, S.W. 1, England (Apr. '38)

**Dahle, C. A.,** Supt., Stoughton Water Works, Stoughton, Wis. (July '35)

**Dahljelm, Irving L.,** Supt., Filtration Plant, 103 North Ave., Highland Park 3, Mich. (Jan. '38) *P*

**Dale, H. B.,** Chemist, Chesapeake & Ohio Ry. Co., 407 C. & O. Station Annex, Huntington, W.Va. (July '37)

**Dalee, William A.,** Pres., Wm. A. Dalee, Inc., 4835 Woodward Ave., Detroit, Mich. (July '38)

**Dallach, W. A.,** Mgr., Products Service Dept., Crane Co., 4100 S. Kedzie Ave., Chicago 32, Ill. (July '35) *P*

**Dalton Fire Dist.,** Kenneth E. Russell, Supt., 399½ Main St., Dalton, Mass. (Corp. M. Jan. '42)

**Damann, Kenneth E.,** Jr. San. Engr., Water Purif. Div., 6843 Oglesby Ave., Chicago 49, Ill. (Jan. '44) *P*

**Damiano, Adolph,** Prin. Asst. Engr., Hackensack Water Co., 4100 Park Ave., Weehawken, N.J. (Jan. '44)

**Damoose, N. G.,** Director of Public Service & City Engr., City Hall, Battle Creek, Mich. (July '42) *MP*

**Dandridge, E. F.,** Chief Clerk, Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34) *A*

**Daniel, Laurence Handy,** Mgr., Daniel, Inc., 814–15 Metropolitana Bldg., Havana, Cuba (Apr. '39)

**Daniels, Francis E.,** State Dept. of Health, Eng. Div., 4017 N. Second St., Harrisburg, Pa. (Sept. '16) ★

**Daniels, Paul I.,** Land Agent, East Bay Munic. Utility Dist., 512—16th St., Oakland 12, Calif. (May '33) *M*

**Daniels, Percy,** Supt., Water Dept., Box 404, Weleetka, Okla. (Oct. '39)

**Danner, H. M.,** Dist. Sales Mgr., The Permutit Co., 522 Union Bldg., 1836 Euclid Ave., Cleveland 15, Ohio (July '37)

**Daple, Luis Perez,** Engr., Frederick Snare Corp., Mess No. 5, U.S. Naval Station, Guantanamo Bay, Cuba (Jan. '41)

**Dappert, Anselmo F.,** Mayflower Apts., 6 S. Lake Ave., Albany, N.Y. (Apr. '31) ★

**Darby, George M.,** Director, Westport Mill, The Dorr Co., 61 Washington Ave., Westport, Conn. (Apr. '36)

**Darcey, Henry J.,** Chief Engr., State Health Dept., State Capitol, Oklahoma City 5, Okla. (Jan. '43)

**Darco Corp.,** L. M. Gill, 60 E. 42nd St., New York 17, N.Y. (Assoc. M. Jan. '36)

**Darling, Ernest Howard,** Cons. Engr., 21 Stanley Ave., Hamilton, Ont., Can., (Dec. '25) *P*

**Darling, K. E.,** Gen. Mgr., Southern Wyoming Utilities, Rock Springs, Wyo. (Oct. '37)

**Darling Valve & Mfg. Co.,** M. L. Hough, Pres., Williamsport 28, Pa. (Assoc. M. May '08)

**Darrow, Henry D.,** Supt., Water Works Dept., 408 Broadway, Kingston, N.Y. (Jan. '36)

**Daugherty, A. B.,** Supt., Water Works, East Gary, Ind. (Jan. '41)

**Daugherty, Frank,** Pres., Scofield Engineering Co., 1324 Commercial Trust Bldg., Philadelphia 2, Pa. (Mar. '31)

**Davenport, J. D.,** Pres. & Treas., Sturgis Water Works Co., Sturgis, S.D. (July '35) *M*

**Davidson, Charles M.,** *see* Kentucky State Dept. of Health

**Davidson, Frederick R.,** *see* Hicksville Water Dist.

**Davidson, J. O.,** Chemist, Water Dept., 820 Beatties Ford Rd., Charlotte, N.C. (Oct. '39)

**Davidson, James B., Jr.,** 1807 Hendricks Blvd., Fort Smith, Ark. (Jan. '44) *M* ★

**Davies, W. F.,** *see* Gloversville Water Works

**Davis, Albert R.,** Supt., Water Dept., Austin 4, Tex. (Jan. '35) *M* ★

**Davis, Ben G.,** Supt., Pipe Line, Rawlins Water Supply Co., Rawlins, Wyo. (July '35)

**Davis, Carleton E.,** Vice-Pres., Philadelphia Suburban Water Co., 762 Lancaster Ave., Bryn Mawr, Pa. (Apr. '12) *Trustee '16–'18. Vice-Pres. '19. President '20. Exec. Com. '21–'22. Honorary M. '39.*

**Davis, Charles A.,** San. Engr., City & County of Denver, 372 City & County Bldg., Denver, Colo. (Oct. '43)

**Davis, Charles N.,** Foreman, Water Dept., 51 Anniston Ave., S.E., Atlanta, Ga. (Oct. '43) *M*

**Davis, Chas. W.,** Supt., Water Dept., City Hall, Petersburg, Va. (Jan. '43) *P*

**Davis, Clarence A.,** Water Supervisor, E. I. du Pont de Nemours & Co., Station B, Buffalo 7, N.Y. (Oct. '40) *P*

**Davis, Daniel E.,** The Chester Engrs., 210 East Parkway, N.S., Pittsburgh 12, Pa. (May '30) *P*

**Davis, Don C.,** Civ. Engr., 1649 Achor Court, Modesto, Calif. (Jan. '41) *M*

**Davis, Edwin Dyers,** Asst. Gen. Mgr., Dominion Flow Meter Co., Ltd., 54 Wellington St., W., Toronto 1, Ont., Can. (Jan. '43) *P*

**Davis, Gerald L.,** Chief Chemist, Decatur Water Works, Decatur 16, Ill. (Jan. '44) *P*

**Davis, H. F.,** Dist. Mgr., Wallace & Tiernan Co., Inc., 1902 Pinewood Circle, Charlotte 4, N.C. (Dec. '23) *P*

**Davis, Hubert,** Chief Engr., City Water Works, Box 449, Waco, Tex. (July '44) *MP*

**Davis, Jack,** Dist. Mgr., Iowa Valve Co., 523 W. 25th Pl., Chicago 16, Ill. (Apr. '43)

**Davis, John Q.,** *see* Nehi Corp.

**Davis, Kenneth,** *see* North Creek Water Dist.

**Davis, M. D.,** Supt., Water Dept., Dillon, S.C. (July '39)

**Davis, Marvin L.,** Director of Public Service, 203 Municipal Bldg., Akron 8, Ohio (Jan. '44)

**Davis, P. D.,** Assoc., Wm. M. Piatt, Cons. Engrs., Durham, N.C. (Oct. '39) *AP*

**Davis, R. E.,** Supt., Water Dept., Brownsville, Tenn. (Apr. '43)

**Davis, S. H.,** Supt., Benwood & McMechen Water Co., 4820 Water St., Benwood, W.Va. (Mar. '34)

**Davis, Thomas V.,** Gen. Supt., Operations, Riddle Aeronautical Institute, Carlstrom Field, Arcadia, Fla. (Jan. '44) *M*

**Dawes, E. A.,** Dawes Silica Mining Co., Thomasville, Ga. (Feb. '33)

**Dawson, F. M.,** Dean, College of Eng., Univ. of Iowa, Iowa City, Iowa (Oct. '28) *M*

**Day & Zimmermann, Inc.,** Theodore E. Seelye, Vice-Pres., 620 Packard Bldg., Philadelphia 2, Pa. (Corp. M. Apr. '42)

**Day, Isaac L.,** Comr. of Public Works, 4 Wheeler Ave., Pleasantville, N.Y. (Apr. '38)

**Day, John S.,** Mgr. & Vice-Pres., Maryland Water Works Co., 76 E. Main St., Westminster, Md. (July '40)

**Dayton Foundry, Inc.,** C. J. Bradley, 11803 Industrial Ave., Hollydale, Calif. (Assoc. M. Oct. '30)

**Dean, Harold R.,** Supt. of Public Works, Eastman Park, Poughkeepsie, N.Y. (Apr. '41)

**Dean, John B.,** Div. Engr., Supply & Purifying Sec., St. Louis Water Div., 1640 S. Kingshighway, St. Louis 10, Mo. (Apr. '30)

**Dearborn Chemical Co.,** C. I. Loudenback, Industrial Dept., 310 S. Michigan Ave., Chicago, Ill. (Assoc. M. June '27)

**Deas, R. R., Jr.,** Asst. to Vice-Pres., American Cast Iron Pipe Co., Box 2603, Birmingham 2, Ala. (Jan. '41)

**DeBerard, Emmons W.,** 802 Elmwood Ave., Wilmette, Ill. (Oct. '41) ★

**DeBerard, W. W.,** City Engr., 402 City Hall, Chicago 2, Ill. (June '12) *Director '42–'45. Honorary M. '42 MP*

**De Boer, Sidney,** Filter Plant Operator, 29 Moross Rd., Village of Grosse Pointe Farms 30, Mich. (Apr. '39) *P*

**De Boise, Joseph,** Asst. Water Supt., Water Dept., 68 Central Ave., Lodi, N.J. (July '43)

**de Brito filho, F. Saturnino R.,** San. Engr., Caixa Postal 1631, Rio de Janeiro, Brazil, S.A. (May '30)

**Decker, A. Clinton,** San. Engr., Tennessee Coal, Iron & R.R. Co., Birmingham 2, Ala. (June '14) *P*

**Decker, Arthur J.,** Cons. Civ. Engr., State Savings Bank Bldg., Ann Arbor, Mich. (May '23)

**Decker, L. L.,** Supt., Water Dept., Leroy, Ohio (Apr. '43) *P*

**Decker, R. E.,** Mech. Engr., Bellevue, Mich. (Oct. '42)

**De Costa, Joseph D.,** Engr. in Charge of Distr., East Bay Munic. Utility Dist., 512—16th St., Oakland, Calif. (Sept. '23) ★

**Dees, Ben W.,** Assoc. Engr., Marion L. Crist & Assoc., 1101 Union Life Bldg., Little Rock, Ark. (Apr. '43) *P*

**Deeter, Henry A.,** Supt. of Water Works, Ansonia, Ohio (July '44)

**Degen, John J.,** Civ. Engr., Degen Engineering Co., 817 Geneva St., Burlington, Wis. (Jan. '42)

**de Goicoechea, Leandro,** Asst. Prof., Escuela de Ingenieros, Universidad de la Habana, Havana, Cuba (July '38)

**De Groot, J. C.,** Mgr., Northampton Borough Munic. Authority, 2019 Main St., Northampton, Pa. (Jan. '31) *AMP*

**De Hart, Jessup,** Mech. Engr., Public Service Co. of Indiana, 422 W. 4th St., Bicknell, Ind. (Oct. '42)

**Deighton, John T.,** Comr. & Pres., Passaic Valley Water Com., 125 Ellison St., Paterson, N.J. (Oct. '43) *A*

**deJarnette, N. M.,** Public Health Eng. Div., State Dept. of Public Health, Atlanta 3, Ga. (Mar. '30) *P*

**deJong, Tim,** Civ. Engr., 718—5th St., Astoria, Ore. (Jan. '42) ★

**De Laporte, A. V.,** Chem. Engr., Ontario Dept. of Health, 807 Richmond St., W., Toronto, Ont., Can. (July '37)

**De Laval Steam Turbine Co.,** H. V. Petersen, Sales Mgr., Trenton 2, N.J. (Assoc. M. Nov. '17)

**Delavan Water Com.,** Merle H. Clapper, Supt., Delavan, Wis. (Corp. M. June '23)

**De Leuw, Charles E.,** Engr., 20 N. Wacker Drive, Chicago 6, Ill. (Nov. '23)

**Del Guzzo, A.,** Pres., North West Water Co., Box 170, Route 3, Renton, Wash. (Apr. '44)

**Deliso, Joseph,** 294 Columbus Ave., Springfield, Mass. (Jan. '39)

**Dellone, Fred, Jr.,** Dellone Construction Co., Thomas Bldg., 1316 Wood St., Dallas 1, Tex. (Apr. '40)

**Delphi Water Works,** Clyde Robbins, Asst. Water Supt., Delphi, Ind. (Corp. M. Apr. '40)

**DeMartini, Frank Edward,** San. Engr., U.S. Public Health Service, Washington 14, D.C. (Sept. '27) *P*

**Dement, Edward F.,** Chief Plumbing Foreman, Post Engineers, Camp Butner, 1201 Mangum St., Durham, N.C. (Oct. '42)

**Deming Water Dept.,** A. J. Noyes, Deming, N.M. (Corp. M. May '19)

**Dempster, Andrew,** Asst. San. Engr., Detroit Dept. of Health, 3919 John R. St., Detroit, Mich. (Oct. '39)

**DeMunn, E. M.,** *see* Geneseo Water Works

**Denef, Herman,** *see* Hanover Public Utilities Com.

**Denise, William D.,** *see* Greece, Town of, Water Dept.

**Denman, F. H.,** *see* Howard Supply Co.

**Dennett, Robert C.,** Hydr. Engr., National Board of Fire Underwriters, 85 John St., New York 7, N.Y. (May '14)

**Denney, Betty (Miss),** Sr. San. Chemist, City of Chicago, 6843 Oglesby Ave., Chicago 49, Ill. (Jr. M. Apr. '44) *P*

**Dent, Wilbur M.,** Gen. Mgr., City Power & Water Dept., Sheffield, Ala. (Jan. '40)

**Denver, City & County of,** Board of Water Comrs., George F. Hughes, Mgr., Box 629, Denver 1, Colo. (Corp. M. Apr. '34)

**Denyes, P. C.,** Mgr., Campbellford Water & Light Com., Box 440, Campbellford, Ont., Can. (Jan. '41)

**Deo, R. R.,** Chief Chemist, Paterson Engineering Co.-India-Ltd., Box 680, Calcutta, India (Oct. '38)

**Derby, Ray L.,** Asst. San. Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (May '26) *P*

**DeRuiter, Herbert,** Supt., Water Dept., 5412 Franklin Ave., Oak Lawn, Ill. (July '42) *M*

**de Santamaria, Carlos S.,** San. & Civ. Engr., Apdo. No. 409, Bogota, Colombia, S.A. (Jan. '35)

**Des Baillets, C. J.,** Chief Engr., Hydroelec. Div., 3161 Joseph St., Verdun, Que., Can. (Mar. '34)

**de Sena, Luis,** Co-Owner & Cons. Engr., Sancti Spiritus Acqueduct, Calle 13 esq. 6, Vedado, Havana, Cuba (Oct. '40)

**Deseronto Public Utilities Com.,** S. C. Hughes, Supt., Water Dept., Deseronto, Ont., Can. (Corp. M. Jan. '37)

**Deslauriers, Alfred J.,** Civ. Engr., City Hall, No. 1—18th Ave., Lachine, Que., Can. (Dec. '33) *M*

**Des Moines Water Works,** Dale L. Maffitt, Secy. & Gen. Mgr., Des Moines 7, Iowa (Corp. M. Jan. '36)

**Desmond, Henry J.,** Plant Operator, 528 Acacia Ave., Hawthorne, Calif. (Oct. '43) *P*

**Detroit Edison Co., The,** H. S. Walker, Director of Research, 2000—2nd Ave., Detroit 26, Mich. (Corp. M. Apr. '44)

**Detweiler, John C.,** Water Engr., Metropolitan Utilities Dist., Omaha 2, Neb. (Mar. '30) *M*

**Deuchler, Walter E.,** Cons. Engr., 63 S. La Salle St., Aurora, Ill. (Oct. '41) *P*

**Devendorf, Earl,** Asst. Director, Div. of Sanitation, State Health Dept., 1228 State St., Schenectady 4, N.Y. (May '19) *Diven Medal '43. Fuller Award '43. MP*

**Devers, Theo. J.,** Supt. & Operator, Midway Munic. Water Works, Midway, Ky. (July '41)

**Devilbiss, H. Roland,** Dept. Engr., Washington Suburban Sanitary Dist., Hyattsville, Md. (Apr. '22) *M*

**Devine, B. A.,** *see* Mueller Brass Co.

**Devore, E. J.,** Supt., Boro Water Works, 403 Center St., Cambridge Springs, Pa. (Affil. July '41)

**deWaard, Herman,** Supt., Water Dept., 44 Washington Ave., Suffern, N.Y. (Apr. '43)

**Dewey, Hugh S.,** Mgr., Western New York Water Co., 11 Niagara St., Buffalo 2, N.Y. (May '29) *Director '44–'47.*

**DeWolf, A. B.,** 1225 N.W. 32nd St., Miami 37, Fla. (Jan. '40) *P* ★

**D'Gerolamo, Paul,** Purchasing Agt., East Jefferson Water Works No. 1, Kenner, La. (Oct. '42)

**Diamond Alkali Co.,** J. D. Mattern, Mgr. of Alkali Sales, 2400 Oliver Bldg., Pittsburgh 22, Pa. (Assoc. M. Apr. '37)

**Dibert, H. M.,** *see* Gurley, W. & L. E.

**Dick, Christian E.,** *see* Mineola, Inc. Village of

**Dickerson, Paul,** *see* Atlas Carbon & Clay Corp.

**Dickson, D. B.,** San. Engr., 3001 Milton Ave., Dallas 5, Tex. (Jan. '39) *P* ★

**Dickson, John S.,** Mgr., Public Utility Dist. No. 1 of Wahkiakum County, Cathlamet, Wash. (Apr. '43) *M*

**Dickson, W. K.,** Civ. Engr., 119 Circle Ave., Charlotte 4, N.C. (Apr. '38) *P* ★

**Dieckmann, J. H., Jr.,** *see* Vallejo Water Co.

**Diederich, Peter,** *see* Glendale Public Service Dept.

**Diehl Pump & Supply Co.,** Robert B. Diehl, Owner & Mgr., 800 Fehr Ave., Louisville 4, Ky. (Assoc. M. July '42)

**Diehl, Robert B.,** *see* Diehl Pump & Supply Co.

**Diemer, Robert B.,** Chief Operator & Maint. Engr., Metropolitan Water Dist., 306 W. 3rd St., Los Angeles 13, Calif. (Oct. '37)

**Dierker, Fred H.,** 914 Lacy St., Santa Ana, Calif. (Oct. '42) ★

**Dietz, Henry B.,** City Chemist, Box 27, Corpus Christi, Tex. (Jr. M. Jan. '42)

**Dignan, B. T.,** Chemist & Bacteriologist, City Water Works, Niagara Falls, N.Y. (Apr. '19)

**Dill, W. N.,** Mgr., Mueller Co., Pacific Coast Factory, 2801 E. 12th St., Los Angeles 23, Calif. (July '38)

**Dillery, R. E.,** Filter Operator, Camp Campbell Water Plant, Guthrie, Ky. (Jan. '43)

**Dillon, G. M.,** Supt. of Public Works, Borough of Braddock, 727 Braddock Ave., Braddock, Pa. (Apr. '38)

**Dillon, James J.,** 43 Lyndhurst Ave., Providence, R.I. (July '38) ★

**Dillon, Richard,** Registrar, Water Bureau, Metropolitan Dist. Com., 650 Main St., Hartford 4, Conn. (Aug. '29)

**Dilworth, H. M.,** Assoc. Water Supply Engr., Dept. of Transport, 118 Pacific Bldg., Vancouver, B.C., Can. (Jan. '38)

**Dimick, Arthur E.,** Asst. Secy., Appleton Water Com., 125 N. Walnut St., Appleton, Wis. (Apr. '29)

**Disario, Gabriel M.,** Private Consultant, Ave. los Pinos 2D, La Florida, Caracas, Venezuela, S.A. (Apr. '43)

**Dishner, Paul J.,** Capt., Office of Dist. Engr., Atlanta Eng. Dist., 494 Spring St., N.W., Atlanta, Ga. (Apr. '42) ★

**District of Columbia Water Dept.,** Harold A. Kemp, Director of San. Eng., Municipal Bldg., Washington, D.C. (Corp. M. Apr. '31)

**Ditchburn, A. E.,** *see* Strathroy Public Utilities Com.

**Ditto, L. M.,** Plumbing Supt., Maintenance Dept., Water Dept., Vanport City, Ore. (July '43)

**Diven, John M.,** Engr., The Leadite Co., Inc., 34-45—84th St., Jackson Heights, N.Y. (June '13)

**Diven, Melvin H.,** Supt. & Secy., Mt. Union Boro Water Works, Box 96, Mt. Union, Pa. (July '35)

**Divine, Leslie T.,** Water Plant Operator, Monticello, N.Y. (Jan. '36) *M*

**Dixie Lime Products Co.,** T. F. Sheridan, Ocala, Fla. (Assoc. M. Apr. '37)

**Dixon, F. S.,** Salesman, Homelite Corp. & Flexible Underground Pipe Cleaning Co., 1624 Harmon Pl., Minneapolis 3, Minn. (Apr. '41)

**Dixon, G. Gale,** Cons. Engr., Parsons, Brinckerhoff, Hogan & Macdonald, 142 Maiden Lane, New York 7, N.Y. (June '20) *MP*

**Dixon, Jas. I.,** Supt., Water Dept., 401 Benton St., Santa Clara, Calif. (May '26)

**Dixon, John,** Supt., Silvis Water Dept., 249—8th St., Silvis, Ill. (July '42)

**Dixon, Joseph, Crucible Co.,** R. H. Horner, Mgr., Paint Sales Div., Jersey City 3, N.J. (Assoc. M. Oct. '40)

**Dixon, M. F.,** Acting Foreman, Water Dept., Billings, Mont. (Jan. '44)

**Dixon, R. M.,** Highlander Apts., Dallas 4, Tex. (Apr. '38) *MP* ★

**Doane, Norman D.,** 831 E. Morehead St., Charlotte 3, N.C. (Sept. '31) *P*

**Dobbin, R. L.,** Gen. Mgr., Peterborough Utilities Com., 295 Reid St., Peterborough, Ont., Can. (Feb. '23) *Trustee '26–'28. Diven Medal '30. President '32. Director '32–'33. Honorary M. '37. P*

**Docal, Antonio T.,** Civ. Engr., Calle 14, No. 353, Vedado, Havana, Cuba (July '38)

**Dodd, C. I.,** Black & Veatch, 4706 Broadway, Kansas City 2, Mo. (July '44)

**Dodd, C. K. S.,** 206 Commercial & Professional Court Bldg., Sarasota, Fla. (Jan. '36) *P*

**Dodd, Harlan C.,** Supt., Water Works, 696 Monroe St., Charlestown, Ind. (Jan. '44) *M*

**Dodd, Rennie I.,** Exec. Mgr., Chester Munic. Authority-Water Service, Box 67, Chester, Pa. (Apr. '22) *M*

**Dodge, Fred L.,** Vice-Pres., California Water Service Co., Box 1150, San Jose 8, Calif. (July '26) *M*

**Dodge, H. E.,** City Engr. & Water Supt., City Hall, Port Angeles, Wash. (Jan. '41) *M*

**Dodson, Roy E., Jr.,** San. Engr., Dept. of Water Development, 268 Civic Center, San Diego, Calif. (July '39) *P*

**Doggett, Felix G.,** San. Engr., State Board of Health, Raleigh, N.C. (Oct. '41) *P*

**Doig, Albert Watson,** Sales Repr., Johnson Sales Co., 4760 Dagenais St., St. Henry, Montreal, Que., Can. (Apr. '39) *P*

**Doland, James J.,** Prof. of Civ. Eng., Univ. of Illinois, 317 Engineering Hall, Urbana, Ill. (Nov. '29)

**Dold, Herbert H.,** Plant Chemist, Louisville Cement Corp., Speed, Ind. (Jan. '41) *P*

**Doll, Byron E.,** Jr. Civ. Engr., Las Vegas Water & Land Co., Las Vegas, Nev. (July '39) ★

**Domke, L. C.,** Supt., Waukegan Water Works No. 2, 1942 North Ave., Waukegan, Ill. (Jan. '41) *P*

**Domogalla, Bernard,** City Bacteriologist, Biologist & Chemist, 110 N. Hamilton St., Madison 3, Wis. (Feb. '26)

**Donaldson, Edgar F.,** Chief Engr., Water Works, R.D. No. 1, Defense Highway, Annapolis, Md. (Feb. '32) *MP*

**Donaldson Iron Co.,** Emaus, Lehigh County, Pa. (Assoc. M. Nov. '17)

**Donaldson, Wellington,** Chief, Bureau of Sewage Disposal Design, Dept. of Public Works, 125 Worth St., New York 13, N.Y. (Apr. '10) *P*

**Dong, Yen H.,** 820 W. 180th St., New York 33, N.Y. (Jan. '42) *P*

**Donnan, William C.,** Div. Supt., Bureau of Water, 412 City-County Bldg., Pittsburgh 19, Pa. (Apr. '30) *M*

**Donohue, E. R.,** *see* Ballston Spa Water Dept.

**Donovan, James D.,** Mgr. of Production & Distr., Board of Public Utilities, City Hall, 6th & Ann Ave., Kansas City 16, Kan. (Apr. '44) *M*

**Doren, Lewis S.,** Mgr., Pekin Water Works Co., 417 Court St., Pekin, Ill. (Jan. '43)

**Dorfner, A. A.,** *see* Plumb, D. S., Co., Inc.

**Dorion, Otto Roberto,** *see* Guatemala City, Cia del Agua del Mariscal, S.A.

**Dorion, Robert,** City Mgr., Shawinigan Falls, Que., Can. (Jan. '36)

**Dorr Co., The,** 570 Lexington Ave., New York 22, N.Y. (Assoc. M. June '27)

**Dorrance, Frank Young,** Div. Engr., Montreal Water Board, 341 Brock Ave., N., Montreal W., Que., Can. (July '20)

**Dose, Herman W.,** Route No. 1, Weslaco, Tex. (Apr. '44) *M*

**Dotterweich, A. J.,** 2945 Oak Park Rd., Pittsburgh 14, Pa. (July '38)

**Dougherty, Ben R.,** Supt., Richmond Water & Gas Works, Richmond, Ky. (Apr. '24)

**Dougherty, E. R.,** Supervising Chem. Engr., Allison G.M.C., Plant 21, Indianapolis 5, Ind. (Affil. Jan. '43) *P*

**Douglass, H. S.,** *see* Statesville City Water Dept.

**Dover Water Comrs.,** Earl C. Nelson, Clerk, Municipal Bldg., Dover, N.J. (Corp. M. May '18)

**Dow Chemical Co.,** *see* Great Western Div.

**Dow, Douglas,** Detroit Edison Co., 2000 Second Ave., Detroit, Mich. (July '38) ★

**Dow Magnesium Corp.,** F. E. Lewis, Supt., Chem. Eng. Dept., Velasco, Tex. (Corp. M. Jan. '43)

**Dowdell, P. H.,** Mgr., White Deer Mountain Water Co., 114 S. Front St., Milton, Pa. (Jan. '41) *M*

**Dowlin, M. R.,** Jr. Officer, Dept. of Justice, Bureau of Prison, Box 250, Steilacoom, Wash. (Jan. '44) *P*

**Dowling, Mary, (Miss),** Sales Repr., Vinson Specialty Paint Co., Box 1116, Little River Station, Miami 38, Fla. (Oct. '43)

**Down, Howard M.,** *see* Vineland Water Dept.

**Downer, William J.,** Chief San. Engr., State Dept. of Public Health, Springfield, Ill. (Jan. '36) *P*

**Downing, Clyde L.,** Plant Operator, R. 3, Wagoner, Okla. (Jan. '44) *P*

**Downs, G. H.,** Mgr., Crane Co., 30th St. & 1st Ave., S., Billings, Mont. (Jan. '40)

**Dowsley, R. R.,** Supt., Prescott Public Utilities Com., Prescott, Ont., Can. (Apr. '41)

**Doyle, Victor H.,** Dist. Mgr., Pacific States Cast Iron Pipe Co., Rialto Bldg., San Francisco 5, Calif. (Oct. '39)

**Doyle, William H.,** Asst. San. Engr., State Board of Health, Box 270, Wisconsin Rapids, Wis. (Apr. '42)

**Drake, Alan D.,** Director of Water, City Hall, Buffalo 2, N.Y. (Jan. '34) *MP*

**Drake, Chester F.,** Supt. of Filtration, 226 Delafield Ave., Aspinwall, Pa. (Apr. '10) *Fuller Award '41.*

**Drake, William O.,** Cons. Engr., 35 E. 4th St., Corning, N.Y. (Apr. '17)

**Drane, Brent S.,** Prin. Engr., Water Div., Office of War Utilities, War Production Board, 2153 California St., N.W., Washington 8, D.C. (Oct. '43)

**Draves, Harry J.,** Supt., Dept. of Water Works, 532 Franklin St., Michigan City, Ind. (Jan. '38) *M*

**Dresden, Town of,** E. J. Kyle, Town Clerk, Dresden, Ont., Can. (Corp. M. July '41)

**Dresser Mfg. Co.,** Hector P. Boncher, Sales Mgr., Bradford, Pa. (Assoc. M. June '04)

**Drewry, E. M.,** Supt., Munic. Water Plant, Whitewater, Wis. (Apr. '41)

**Driftmier, Mark E.,** Supt., Munic. Water Works, 314 N. Fourth St., Burlington, Iowa (July '37)

**Driggs, Edwin L.,** Office Engr., East Bay Munic. Utility Dist., 512—16th St., Oakland 4, Calif. (May '33) *M*

**Driscoll, Florence E.,** Water Registrar & Secy., Haverhill Water Dept., 14 Court St., Haverhill, Mass. (July '37)

**Driskell, Thos. E.,** Water Supply Engr., Dept. of Public Welfare, State Office Bldg., Columbus 16, Ohio (Apr. '42) *MP*

**Drost, W. P.,** Water Supt., Box 431, Bend, Ore. (July '35)

**Druley, M. E.,** Asst. Dist. Mgr., Dayton Power & Light Co., Wilmington, Ohio (Jan. '43) *MP*

**Du Bois Bureau of Water,** M. E. Milliren, City Engr., City Hall, Du Bois, Pa. (Corp. M. Oct. '39)

**Dubois, F. W.,** Pres., Dubois-Webb Co., 2832 E. Grand Blvd., Detroit 11, Mich. (Jan. '38)

**du Bruyne, Robert M.,** 824 Circle Drive, High Point, N.C. (Oct. '41) ★

**Duckett, Roy,** Supt., Water Dept., Sweetwater, Tex. (Oct. '39) *M*

**Duckworth, Leon S.,** Supt. of Filtration, Bureau of Water, R.D. No. 5, Lancaster, Pa. (Jan. '37) *MP*

**Dudley, H. M.,** Salesman, Utilities Supply Co., 1736 E. 15th St., Los Angeles 21, Calif. (Sept. '29)

**Dudley, Nolan L.,** Supt. of Filtration, Water Works, Columbus, Ga. (Apr. '43)

**Duff, Robert A.,** *see* Medford Water Com.

**Duff, William,** Supt. of Filtration, Box 178, Malartic, Que., Can. (July '42) *MP*

**Duffy, William B.,** Supt., Public Works, North Andover, Mass. (July '35) *AM*

**Dufresne, Paul Edmond,** City Engr., P.B. 203, Trois-Rivieres, Que., Can. (July '38)

**Dugger, Eugene F.,** Gen. Mgr., Newport News Water Works Com., Newport News, Va. (May '24) *Director '34–'37, '38–'39. President '38. Fuller Award '43.*

**Duhme, R. E.,** 5911 Red Bank Rd., Box 29-C, R.R. No. 10, Cincinnati 27, Ohio (Oct. '38) *M*

**Duis, E. J.,** Supt., Oswego Water System, Oswego, Ore. (Apr. '41)

**Duke, L.,** Supt. & Mgr., Clearwater-Hynes County Water Dist., Hynes, Calif. (Oct. '40)

**Duke, M. B.,** *see* Jones, James, Co., Inc.

**Dumas, Armand,** Town Mgr., Box 90, Malartic, Que., Can. (Jan. '43)

**Dummer, Otto W.,** Supt. of Meters & Services, Milwaukee Water Works, 109 City Hall, Milwaukee 2, Wis. (Jan. '42)

**Duncan, Jas. G.,** Asst. Chem. Engr., Ontario Dept. of Health, 807 Richmond St., W., Toronto 3, Ont., Can. (Jan. '43) *P*

**Duncan, Malcolm,** Civ. Engr., Gilbert Associates, Inc., 412 Washington St., Reading, Pa. (July '41)

**Duncan, Malcolm E.,** Sales Engr., Johns-Manville Sales Corp., 1701 E. 7th St., Box 2239, Tulsa, Okla. (Jan. '44) *M*

**Dundas Public Utilities Com.,** H. C. Robinson, Secy.-Treas., Dundas, Ont., Can. (Corp. M. Apr. '44)

**Dunden, J. R.,** Mng. Partner, Maplewood Water Co., Route 1, Box 1242, Renton, Wash. (Apr. '44)

**Dunham, F. E.,** Gen. Mgr., Peoples Water Service Co. of Louisiana, Inc., Box 393, Bastrop, La. (Apr. '30) *MP*

**Dunham, Henry G.,** Bacteriologist, 920 Henry St., Detroit 1, Mich. (June '25) *P*

**Dunham, S. R.,** Supt., Water Works Dept., Public Utilities Com., Wiarton, Ont., Can. (Jan. '44) *MP*

**Dunham, Stanley,** 1608 Malcolm Ave., Los Angeles 24, Calif. (Oct. '34)

**Dunkirk Board of Water Comrs.,** W. O. Peck, Supt., City Hall, Dunkirk, N.Y. (Corp. M. Apr. '37)

**Dunmire, E. H.,** Prin. Materials Engr., U.S. Ninth Naval Materials Office, 175 W. Jackson Ave., Chicago 4, Ill. (Apr. '40) ★

**Dunn, Stephen M.,** Chief Mech. Engr., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Sept. '31) *M*

**Dunn, Town of,** Dunn, N.C. (Corp. M. Oct. '42)

**Dunn, William Carey,** Supt., Mt. Hope Filter Plant, Box 1441, Cristobal, Canal Zone (Apr. '19)

**Dunnville Public Utilities Com.,** H. E. Foster, Mgr., Dunnville, Ont., Can. (Corp. M. Jan. '35)

**Dunstan, Gilbert H.,** Assoc. Prof. of San. Eng., Univ. of Alabama, Box 1996, University, Ala. (July '31)

**Dunstan, James,** City Engr., City Engr.'s Office, City Hall, Wenatchee, Wash. (Apr. '38) *MP*

**Durant, Clifton H.,** Pipe Constr. & Maint., Los Angeles Water Dept., 410 Ducommun St., Los Angeles 12, Calif. (Oct. '43) *M*

**Durbin, W. H.,** Mgr., Terre Haute Water Works Corp., 119 S. 7th St., Terre Haute, Ind. (May '23)

**Durbrow, William,** *see* Nevada Irrigation Dist.

**Durham Water Dept.,** D. McGregor Williams, City Hall, Durham, N.C. (Corp. M. July '34)

**Durner, Fred J.,** Fred J. Durner Co., Trotwood Acres, Pittsburgh 16, Pa. (Oct. '39)

**Durrance, Dallas H.,** Supt., Light, Water & Gas, 103 S. Pine St., Sebring, Fla. (Jan. '44)

**Dutton, Marshall S.,** Supt. of Water, Municipal Bldg., Oak Park, Ill. (Apr. '37) *A*

**Duvall, Arndt J.,** San. Engr., Toltz, King & Day, Inc., 1509 Pioneer Bldg., St. Paul 1, Minn. (Apr. '41)

**Duy, Carl,** Engr. of Water Works, Aurora Water Dept., Aurora, Ill. (Oct. '41) *M*

**Dwyer, John D.,** Chairman, Water & Sewer Board, 110 S. Border Rd., Medford, Mass. (May '22)

**Dwyer, John James,** Chief Chemist, Chesapeake & Ohio Ry. Co., 932 Ninth Ave., Huntington 1, W.Va. (Jan. '41)

**Dwyer, Thomas E.,** *see* Lead Lined Iron Pipe Co.

**Dye, C. K.,** Dist. Mgr., Pomona Pump Co., 372 Arden Rd., Columbus, Ohio (Apr. '42)

**Dye, Edward R.,** 115 E. Amherst St., Buffalo, N.Y. (Apr. '43)

**Dye, John F.,** Chief Operator, Water Conditioning Plant, Board of Water & Elec. Light Comrs., Lansing 3, Mich. (July '43) *MP*

**Dyer, Edward A.,** Supt., Water Dept., Cobleskill, N.Y. (Apr. '37)

**Eakin, R. O.,** Mgr., Water Works, Lodi, Ohio (July '44)

**Earhart, Fred A.,** Comr. of Public Utilities, City Hall, New Orleans 12, La. (July '37) *P*

**Earls, Clifford E.,** Supt. & Chemist, Water Treatment & Filtration Plant, St. Augustine, Fla. (Oct. '43) *MP*

**Early, Mart,** Water & Sewage Supt., Water Dept., Moscow, Idaho (Apr. '40)

**Earp, Fred B.,** 2206 Pershing St., Durham, N.C. (Jan. '41) ★

**East Aurora, Village of,** V. E. Haemmerlein, Village Engr., Main St., East Aurora, N.Y. (Corp. M. Apr. '37)

**East Bay Munic. Utility Dist.,** J. S. Longwell, Chief Engr. & Gen. Mgr., 512—16th St., Box 720, Oakland 4, Calif. (Corp. M. Sept. '29)

**East Chicago Dept. of Water Works,** Albert G. Vinick, Supt., 4733 Olcott Ave., East Chicago, Ind. (Corp. M. Jan. '36)

**East Coast Water Co.,** Garland S. Sydnor, Box 1476, Richmond 12, Va. (Corp. M. Oct. '41)

**East Helena, City of,** Water Dept., A. H. Carlson, Clerk, East Helena, Mont. (Corp. M. Apr. '38)

**East, L. A.,** Supt. of Water Works, Savannah, Ga. (Nov. '29)

**East Moline Water Works Dept.,** Arnold Neihaus, Supt., City Hall, East Moline, Ill. (Corp. M. Oct. '41)

**East Orange Board of Water Comrs.,** Water Dept., Roswell M. Roper, Water Engr., East Orange, N.J. (Corp. M. Aug. '09)

**East York, Township of,** Grant R. Jack, Comr. of Works, 443 Sammon Ave., Toronto, Ont., Can. (Corp. M. Jan. '35)

**Easterday, E. E.,** Water Comr., 312 City Hall, 12th & Market Sts., St. Louis 1, Mo. (May '26)

**Eastwood, C.,** *see* London Public Utilities Com.

**Eastwood, Charles H.,** Wallace & Tiernan Co., Inc., Newark 1, N.J. (July '35) *P*

**Eaton, Thomas J.,** 400 S. Linden Ave., Pittsburgh 8, Pa. (July '35) *MP* ★

**Ebasco Services, Inc.,** A. C. Clogher, 2 Rector St., New York, N.Y. (Corp. M. Mar. '29)

**Ebaugh, Robert M.,** Asst. Engr., Southern California Water Co., 418 N. Pine St., San Gabriel, Calif. (Jan. '40)

**Eben, Christian F., Jr.,** Assoc. Engr., The Baker Engrs., 115 Shields St., Rochester, Pa. (July '43)

**Eberling, Carl A.,** Supt., Water Works Dept., 242 City Hall, Cincinnati 2, Ohio (June '34) *M*

**Ebert, Arvine G.,** Office Mgr., Illinois Water Service Co., 124 W. Washington St., Pontiac, Ill. (Oct. '41) *MP*

**Ebert, R. E.,** Chemist, Water Dept., 840 Knollwood St., Winston-Salem 7, N.C. (Dec. '33) *P*

**Ebright, H. L.,** Dist. Mgr., Robert W. Hunt Co., 658 Chamber of Commerce Bldg., Los Angeles 15, Calif. (July '41)

**Ebright, LeRoy,** *see* Westbury Water Dist.

**Eby, Jos. S.,** Local Supt., Water Works Dept., Calgary Power Co., Box 263, Camrose, Alta., Can. (Apr. '42)

**Echarte y Romero, Jorge,** Engr., Manzana de Gomez 326, Havana, Cuba (Jan. '42) *A*

**Eckart, Nelson A.,** Gen. Mgr. & Chief Engr., Water Dept., 425 Mason St., San Francisco 1, Calif. (Mar. '30) *Director '36–'39. M*

**Eckert, Alfred,** Director of Public Works, 3 Jefferson Court, Saginaw, Mich. (Jan. '29)

**Eckert, Otto E.,** *see* Lansing Board of Water & Elec. Light Comrs.

**Eckland, Henry,** Asst. Supt., City Water Dept., 1548 Warren Ave., Bremerton, Wash. (Apr. '43) *M*

**Ecorse, City of,** Leland R. Gare, City Engr., City Hall, Ecorse 18, Mich. (Corp. M. July '42)

**Ecusta Paper Corp.,** Herbert F. Finck, Power & Hydr. Engr., Pisgah Forest, N.C. (Corp. M. Jan. '40)

**Eddy, Harrison P., Jr.,** Cons. Engr., Metcalf & Eddy, 1300 Statler Bldg., Boston 16, Mass. (Apr. '30) *AMP*

**Eddy Valve Co.,** John Knickerbacker, Pres., Waterford, N.Y. (Assoc. M. June '86)

**Edling, John O.,** Supt., Schuylkill Haven Gas & Water Dept., 230 Paxson Ave., Schuylkill Haven, Pa. (Jan. '42) *M*

**Edmonds, W. R.,** Asst. Chief San. Engr., Dept. of Pensions & National Health, 223 Daly Bldg. Annex, Ottawa, Ont., Can. (July '43)

**Edmonton, City of,** W. R. Mount, Engr. & Supt., Water Works Distr. System, Edmonton, Alta., Can. (Corp. M. July '40)

**Edson Corp.,** J. William Wickwire, 49–51 D St., South Boston 27, Mass. (Assoc. M. Mar. '23)

**Edwards, A. B.,** Chief Operator, Pumping Plant, Burlington, Ont., Can. (Jan. '37)

**Edwards, C. H.,** Chief Chemist, Wheeling & Lake Erie Ry. Co., Brewster, Ohio (Oct. '43)

**Edwards, Carl I.,** Water Supt., Pequannock Township Water Dept., Pompton Plains, N.J. (Jan. '42) *M*

**Edwards, David F.,** Head of Process Control, Standard Oil Co. of Louisiana, Box 551, Baton Rouge 1, La. (Oct. '42) *P*

**Edwards, Dwight W.,** Gen. Mgr., Iowa Water Service Co., 224 E. College St., Iowa City, Iowa (Jan. '42)

**Edwards, E. T.,** Supt. of Filtration, Water Works, 1718 N. Second St., Ironton, Ohio (Jan. '44) *P*

**Edwards, G. H.,** Civ. Engr., DeWitt C. Griffin & Assoc., Cons. Engrs., 717 Lloyd Bldg., Seattle, Wash. (July '44)

**Edwards, Howard L.,** Service Engr., R.W. Sparling, 945 N. Main St., Los Angeles 12, Calif. (Apr. '44) *P*

**Edwards, John C.,** Chemist & Asst. Mgr., Huntington Water Corp., 720—4th Ave., Huntington, W.Va. (Apr. '39)

**Edwards, Richard F.,** 3455 Valemont Ave., San Diego, Calif. (July '43)

**Edwards, Robert V.,** Vice-Pres., American Pipe & Construction Co., Box 3428 Terminal Annex, Los Angeles 54, Calif. (Oct. '39)

**Edwards, S. Everett,** Chemist, Bureau of Water Supply, 1313 Crofton Rd., Baltimore 12, Md. (July '42) *P*

**Edwards, William J.,** Comr., City Water Dept., 225 Columbia St., Cumberland, Md. (Apr. '44) *P*

**Edwards, William R.,** Vice-Pres., New York Water Service Corp., 20 East Ave., Rochester 4, N.Y. (Apr. '14)

**Egan, Frank J.,** Vice-Pres., James B. Clow & Sons, Box 6600A, Chicago 80, Ill. (Apr. '44)

**Egan, J. H.,** Crane Co., 321 E. Third St., Los Angeles 13, Calif. (Oct. '31) *M*

**Egbert, Donald C.,** City Mgr., Water Dept., Birmingham, Mich. (Jan. '38)

**Egebrecht, Ray F.,** 5910 N. Kenmore Ave., Chicago 40, Ill. (July '43)

**Eggerling, William J.,** *see* Irvington Water Dept.

**Ehlers, V. M.,** Chief San. Engr., State Dept. of Health, Austin 2, Tex. (Oct. '27) *Fuller Award '41.*

**Eich, Henry F.,** Lt., San Engr., Yuma Army Air Field, Yuma, Ariz. (Apr. '43) *P* ★

**Eichinger, E. C.,** Chemist, Oshkosh Filter & Softener Co., Box 694, Oshkosh, Wis. (July '37)

**Eidsness, F. A.,** Asst. San. Engr., Bureau of San. Eng., State Board of Health, Jacksonville 1, Fla. (May '41) *Fuller Award '44. P*

**Eidson, Frank,** Works Supervisor, Camp Campbell Water Plant, R.F.D. No. 5, Springfield, Tenn. (Jan. '43) *P*

**Eikey, Tony,** Supt. of Public Works, Traverse City Water Dept., 1017 Cass St., Traverse City, Mich. (July '40)

**El Paso Water Dept.,** E. J. Umbenhauer, Supt., Box 511, El Paso, Tex. (Corp. M. Jan. '39)

**Elder, Clayburn C.,** Hydrographic Engr., Metropolitan Water Dist. of Southern California, 306 W. 3rd St., Los Angeles 13, Calif. (Aug. '31) *M*

**Elder, George Randolph, Sr.,** Supt., Dept. of Public Utilities, 200—3rd St., Radford, Va. (July '43)

**Eldred, Norman O.,** Sales Engr., The Permutit Co., 111 E. Washington St., Bloomington, Ill. (Oct. '41) ★

**Eldridge, L. C.,** Engr. & Supt., Baton Rouge Water Works Co., 131 Lafayette St., Baton Rouge, La. (July '42) *M*

**Eldridge, William Jenkson,** Water Dept. Supervisor, E. I. du Pont de Nemours & Co., Rayon Div., Old Hickory, Tenn. (July '40)

**Electric Chemical Co.,** C. V. Baker, Technical Sales—Munic. Dept., 8011 Franklin Blvd., Cleveland, Ohio (Assoc. M. July '36)

**Electro Rust-Proofing Corp.,** E. H. Ingle, Pres., 1026 Wayne Ave., Dayton 10, Ohio (Assoc. M. Apr. '39)

**Elford, John P.,** Salesman, Ohio Salt Co., 213 S. Dunn St., Bloomington, Ind. (Apr. '41) *P*

**Elias, George A.,** Dist. Engr., Bureau of San. Eng., Dept. of Health, 303 Keystone Bldg., Broad & Vine Sts., Philadelphia 7, Pa. (Jan. '44)

**Eliassen, Rolf,** 114 W. 183rd St., New York, N.Y. (Jan. '35) ★

**Elkhorn Light & Water Com.,** Neal B. Thayer, Supt., Elkhorn, Wis. (Corp. M. Oct. '35)

**Ell, Arthur F.,** Gen. Mgr. & Auditor, Interstate Water Co., 141 N. Vernuhon St., Danville, Ill. (July '41)

**Ell, Henry T.,** Asst. San. Engr., State Dept. of Health, 252 Ellery Ave., Newark, N.J. (Oct. '43)

**Ellenberger, A. Richard,** Mgr., Smith-Newton Oil Co. Lab., 137 Main St., Bradford, Pa. (Oct. '43) *MP*

**Eller, Edwin C.,** Engr., Rahway Water Dept., 1470 Campbell St., Rahway, N.J. (Jan. '40) ★

**Ellerbusch, R. P.,** Water Analyst, 1032 Vaughn, Ann Arbor, Mich. (Oct. '38) *MP*

**Ellerker, Stanley,** Supt. of Water Works, Forest, Ont., Can. (July '37)

**Ellington, F. R.,** Supt., Princeton Water Works, Water Works Office, Princeton, Ind. (Jan. '43)

**Elliot, Norman G.,** Water Engr. & Mgr., Torquay Corp. Water Works, Town Hall, Torquay, Devon, England (Oct. '43)

**Elliott, Robert G.,** Asst. Medical Inspector, U.S. Army, Station Hospital, Fort Benning, Ga. (Jan. '42) ★

**Ellis, C. Frank,** Water Supt., City Water Works, 614 Adams St., Los Banos, Calif. (Jan. '43)

**Ellis, Calvin F.,** Supt., Water & Sewer Dept., Town Hall, Moorestown, N.J. (Jan. '44)

**Ellis, F. K.,** Supt., Public Works Dept., Box 128, Sumter, S.C. (Apr. '39) *Fuller Award '44.*

**Ellis, George R.,** Canandaigua, N.Y. (July '07)

**Ellis, Gordon B.,** *see* Windsor Utilities Com.

**Ellis, N. T.,** City Chemist, 21 S. 4th St., Grand Haven, Mich. (Oct. '40) *P*

**Ellis, Richard H.,** Engr., Inspection Dept., Associated Factory Mutual Fire Insurance Cos., 184 High St., Boston 10, Mass. (Apr. '38)

**Ellis, Roy O.,** Mgr., Oskaloosa Munic. Water Plant, Oskaloosa, Iowa (Oct. '42) *MP*

**Ellis, W. R., Jr.,** Bottlers' Service Dept., The Coca-Cola Co., 310 North Ave., N.W., Atlanta 1, Ga. (Jan. '43)

**Ellms, Joseph W.,** Comr. of Sewage Disposal, Dept. of Public Utilities, 103 City Hall, Cleveland 14, Ohio (Oct. '19) *Trustee '23–'25. AMP*

**Ells, J. C.,** City Engr., 207 W. Valley Blvd., El Monte, Calif. (Oct. '43)

**Ellsworth, Harry,** Supt., Water & Light Dept., Meadville, Pa. (July '07)

**Ellsworth, Samuel M.,** Cons. Engr., 6 Beacon St., Boston 8, Mass. (Apr. '30)

**Elmira Water Board,** John G. Copley, Gen. Mgr., 408–412 E. Market St., Elmira, N.Y. (Corp. M. Mar. '15)

**Elnor, G. E.,** *see* North Bay, City of

**Elsener, L. A.,** Dist. Mgr., Chicago Bridge & Iron Co., 416 Rialto Bldg., San Francisco 5, Calif. (Apr. '44)

**Elsman, Ralph,** *see* San Jose Water Works

**Elting, Oscar R.,** Assoc. Engr., Bureau of Water & Sewerage, 403 Municipal Bldg., Akron 8, Ohio (Feb. '30) *AM*

**Elwood Water Works & Sewage Plant,** Clifton W. Berry, Supt., Elwood, Ind. (Corp. M. Apr. '44)

**Ely, Howard M.,** Engr., Interstate Water Co., Danville, Ill. (June '09)

**Ely, Van Horn, Jr.,** *see* Philadelphia Suburban Water Co.

**Embree, Lon J.,** Supt., Munic. Water System, 605 N. Vine St., Magnolia, Ark. (Jan. '43)

**Emerson, Charles A.,** Cons. Engr., Havens & Emerson, 233 Broadway, New York 7, N.Y. (May '08) *P*

**Emerson, David L.,** Assoc. Research Engr., Eng. & Ind. Expt. Station, Univ. of Florida, Gainesville, Fla. (Apr. '44) *MP*

**Emerson, Wm.,** Supt., Water Dept., City Hall, Portland, Ind. (Apr. '40)

**Emery, Floyd A.,** *see* Batavia, City of

**Emigh, William C.,** City Engr., Coatesville, Pa. (Jan. '37)

**End, Charles F.,** Supt., Raritan Township Water Dept., Route No. 19, New Brunswick, N.J. (May '30)

**End, William F.,** Civ. Engr., 2 Georgian Court, Troy, N.Y. (Jan. '36)

**Endicott Water Works Co.,** Earl J. Grippen, Supt., Endicott, N.Y. (Corp. M. Feb. '28)

**Enes, Bernard E.,** Mgr., Enes Water Co., R.F.D. No. 1, Box 480, Pittsburg, Calif. (Oct. '43) *P*

**Engel, P. N.,** Pres., Infilco, Inc., 325 W. 25th Pl., Chicago 16, Ill. (June '19) *P*

**Enger, M. L.,** Dean of College of Eng. & Director of Eng. Expt. Station, Univ. of Illinois, Urbana, Ill. (Mar. '15) *Goodell Prize '40.*

**Engineering News-Record,** E. J. Cleary, Mng. Editor, 330 W. 42nd St., New York 18, N.Y. (Assoc. M. May '18)

**Engle, James W.,** Chem. Engr., 934 N. Irving St., Arlington, Va. (Sept. '23) *P*

**English, J. E.,** *see* American Smelting & Refining Co.

**English, James A.,** City Engr. & Supt. of Water Works, Salisbury, N.C. (Dec. '33)

**Enright, J. Daniel,** Asst. Supervisor of Water Purif., Water Works Dept., California Station, Cincinnati, Ohio (July '43)

**Enslow, Linn H.,** Editor, *Water Works & Sewerage,* 155 E. 44th St., New York, N.Y. (Aug. '18) *Diven Medal '35. Director '36–'42.*

**Entwhistle, Richard R.,** 3735 Drake Ave., Cincinnati 9, Ohio (Apr. '38) *P*★

**Enz, Charles F.,** Supt., Lockport Water Works & Sewerage System, 914 Commerce St., Lockport, Ill. (Oct. '41) *M*

**Erickson, D. L.,** City Engr. & Director of Dept. of Parks, Public Property & Improvements, Lincoln 8, Neb. (June '24) *Fuller Award '41. AM*

**Erickson, Edward E.,** Asst. Engr., Alvord, Burdick & Howson, 20 N. Wacker Drive, Chicago 6, Ill. (Apr. '44) *P*

**Erickson, Frederick K.,** c/o W. H. McGlone, 1122 Milon Ave., Pittsburgh 26, Pa. (Jan. '42)

**Erickson, Harley G.,** Chief Engr., Central Mfg. Dist., Inc., 4814 Loma Vista Ave., Los Angeles 11, Calif. (Apr. '43)

**Erickson, Harold V.,** San. Engr., War Dept., 906 E. Third St., McCook, Neb. (Jan. '43)

**Erickson, Wendell J.,** Asst. San. Engr., State Dept. of Health, 217 Lark St., Albany 6, N.Y. (Jan. '24) *P*

**Erion, Daniel Ray, Jr.,** 605 High St., Milford, Ohio (Apr. '40) *P*

**Erion, Ray,** Supt. & Chemist, Milford Water Works, 605 High St., Milford, Ohio (Apr. '39) *MP*

**Escanaba Munic. Utilities,** George E. Bean, City Mgr., City Hall, Escanaba, Mich. (Corp. M. Oct. '43)

**Eschenfelder, A. F.,** *see* Glen Ridge Water Dept.

**Escoto, Hugo Vivó,** Sociedad Cubana de Ingenieros, Ave. de Belgica, No. 258, Havana, Cuba (Oct. '43)

**Estabrook, Joseph B.,** Vice-Pres., Hitchcock & Estabrook, Inc., 521 Sexton Bldg., Minneapolis 15, Minn. (Apr. '36) *P*

**Estey, Chas. A.,** Repr., Pacific States Cast Iron Pipe Co., 437 S. Hill St., Los Angeles 13, Calif. (Oct. '37) *MP*

**Esty, Roger W.,** Supt., Water Dept., 17 Hobart St., Danvers, Mass. (Mar. '24) *Director '38–'41.*

**Etobicoke, Township of,** F. McArthur, Township Engr., Islington, Ont., Can. (Corp. M. July '41)

**Eugene Water Board,** W. J. Moore, Water Supt., 1116 Willamette St., Eugene, Ore. (Corp. M. Jan. '39)

**Evans, Daniel William,** 735 Hinman Ave., Evanston, Ill. (July '42) *P*

**Evans, Edmund Boyce,** Water Purif. Supervisor, Water Works, 5931 Beacraft, Pleasant Ridge, Cincinnati 13, Ohio (Jan. '27) *MP*

**Evans, Edwin Ronald,** Asst. Engr., Canadian National Ry., Moncton, N.B., Can. (Jan. '44) *MP*

**Evans, G. Taylor,** Vice-Pres. & Gen. Mgr., Ohio Water Service Co., Struthers, Ohio (Apr. '28) *M*

**Evans, J. Claire,** Denver Fire Clay Co., Box 5510, Denver 17, Colo. (Jan. '37)

**Evans, L. J.,** Asst. Div. Mgr., Public Service Co. of Indiana, Inc., Kokomo, Ind. (Jan. '37) *M*

**Evans, R. W.,** Mgr., Water Works, Uvalde, Tex. (Jan. '35) *M*

**Evans, R. W.,** Supt. of Water Works, Versailles, Ind. (Jan. '41)

**Evans, Samuel A.,** Civ. Engr., 1438 N. Coronado St., Los Angeles 26, Calif. (Oct. '34) *A*

**Evansville Water Works Dept.,** Harold A. Ziss, Secy., Box 238, Evansville 9, Ind. (Corp. M. May '06)

**Eveleth, City of,** John E. Aho, Mayor, Eveleth, Minn. (Corp. M. Apr. '43)

**Everett, Jasper W.,** Vice-Pres., Springfield City Water Co., Boonville Ave. & Chestnut St., Springfield, Mo. (May '22)

**Everett, W. J.,** Apdo. 200, Camaguey, Cuba (Jan. '41)

**Everett Water Dept.,** G. G. Paine, City Engr. & Water Supt., 3102 Cedar St., Everett, Wash. (Corp. M. Jan. '35)

**Everson, J. E.,** *see* Princeton Water Dept.

**Everson Mfg. Co.,** Roy B. Everson, Pres., 214 W. Huron St., Chicago 10, Ill. (Assoc. M. Jan. '37)

**Everson, Roy B.,** *see* Everson Mfg. Co.

**Every, Virgil F.,** Artesian Well & Equipment Co., Rochelle Park, N.J. (Jan. '42) ★

**Evrard, James A.,** Box 432, Clinton, Iowa (Apr. '39)

**Ewart, Kennyth L.,** 126 Weller Drive, Cuyahoga Falls, Ohio (July '43)

**Ewing, Byron E.,** Supt., City Water Dept., Arroyo Grande, Calif. (Oct. '41)

**Eyer, Claude W.,** Supt., Water Dept., City Hall, Glendive, Mont. (Feb. '31) *Fuller Award '38. MP*

**Eyer, Frank A.,** Pres., Selinsgrove Water Supply Co., 21 S. Market St., Selinsgrove, Pa. (Apr. '37)

**Faber, Harry A.,** Research Chemist, The Chlorine Institute, Inc., 50 E. 41st St., New York 17, N.Y. (July '35) *P*

**Fager, E. P.,** Dearborn Chemical Co., 310 S. Michigan Ave., Chicago 4, Ill. (Aug. '20) *P*

**Fague, Hugh F.,** Supt. of Constr. & Maint., Bureau of Water Works, 1900 N. Interstate Ave., Portland 12, Ore. (May '33) *M*

**Fahlstrom, David,** Supt., Water Dept., Putnam, Conn. (July '35) *M*

**Fahning, John M.,** Co-Partner, Fahning Contracting Co., 460 Leroy Ave., Buffalo, N.Y. (July '41)

**Fair, Gordon Maskew,** Prof. of San. Eng., Harvard Univ., 7 Scott St., Cambridge 38, Mass. (Jan. '25) *P*

**Fairbairn, John M.,** Inspection Engr., Chas. Warnock & Co., Ltd., 1000 McGill Bldg., 485 McGill St., Montreal, Que., Can. (Apr. '34)

**Fairhurst, William E.,** Director of Public Works, 102 Arlington Ave., Hawthorne, N.J. (July '43)

**Fales, Almon L.,** Cons. Engr., Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston 16, Mass. (Feb. '21) *P*

**Falls, O. M.,** *see* York, Township of

**Farabough, T. E.,** Supt., Water & Sewer Dept., Dumas, Ark. (Oct. '43)

**Farbacher, John B.,** Water Supt., Shaler Township, R.D. No. 8, Box 152, Keystone St., Sharpsburg, Pittsburgh 15, Pa. (Jan. '41)

**Farley, John L., Jr.,** Long Island Water Corp., 337 Merrick Rd., Lynbrook, N.Y. (Jan. '39) *AM*

**Farmer, Chas. C.,** Secy. & Treas., Beckley Water Co., Box 750, Beckley, W.Va. (July '40)

**Farmer, Ed,** 5836 Oak St., Kansas City 2, Mo. (Apr. '44)

**Farnan Brass Works Co.,** Louis P. Smith, Pres., Box 6147, Cleveland 1, Ohio (Assoc. M. May '92)

**Farnsworth, Geo. L., Jr.,** 230 Christie St., Ottawa, Ill. (Jan. '42) *P* ★

**Farquharson, Alex L.,** Mgr., Brockville Public Utilities, Victoria Hall, Brockville, Ont., Can. (Mar. '24) *AM*

**Farr, Fred, Jr.,** 659 Ross Hamilton, Ohio (Oct. '41) ★

**Farrell, J. W. D.,** *see* Regina Water Works Dept.

**Farrell, L. S.,** Filtration Engr., S. F. Bowser & Co., Inc., Fort Wayne 5, Ind. (Jan. '42) *P*

**Farrell, R. P.,** Director, Div. of San. Eng., Tennessee Dept. of Public Health, 420—6th Ave., N., Nashville 3, Tenn. (Apr. '39) *Fuller Award '42. Director '43–'44. P*

**Farson, C. L.,** Supt., Trotter Water Co., Uniontown, Pa. (July '39)

**Farver, Roy,** Supt. & Clerk, Board of Public Affairs, West Milton, Ohio (Apr. '40) *M*

**Fassnacht, George G.,** 5901 E. Washington St., Indianapolis 1, Ind. (Jan. '40) *P*

**Faulks, J. Harris,** Sales Repr., Neptune Meter Co., 20 Bailey Rd., Maplewood, N.J. (Oct. '35)

**Faust, Raymond J.,** Chief, Div. of Water Supply, Bureau of Eng., Michigan Dept. of Health, Lansing 4, Mich. (Jan. '38) *MP*

**Faw, Claude T.,** California Corrugated Culvert Co., 600 Haddon Rd., Oakland 10, Calif. (Nov. '29)

**Fawcett, L. T.,** Secy. & Chief Engr., Mahoning Valley Sanitary Dist., Box 298, Youngstown 1, Ohio (July '39) *M*

**Fawkes, A. W. Ellson,** City Engr., City of Moose Jaw, Moose Jaw, Sask., Can. (Apr. '38) *P*

**Faye, Martin,** Chem. & Eng. Service, Industrial Chemical Sales Div., 844 Leader Bldg., Cleveland 14, Ohio (Apr. '43) *P*

**Feben, Douglas,** Sr. San. Chemist, City Filtration Plant, Water Works Park, Detroit 14, Mich. (Jan. '36) *Fuller Award '42.*

**Febry, Wm. E.,** Distr. Supt., Wisconsin Power & Light Co., 1503 Jackson St., Beloit, Wis. (Jan. '41) *M*

**Federal Advisers, Inc.,** J. S. Thornton, Purchasing Agent, 70 Pine St., New York 5, N.Y. (Corp. M. Jan. '39)

**Federal Pipe & Tank Co.,** Leon H. Spaulding, 6851 E. Marginal Way, Seattle 8, Wash. (Assoc. M. Feb. '31)

**Feeney, A. J.,** Asst. Engr., Water Dept., Wilmington 99, Del. (Apr. '19) *M*

**Feinberg, Bernard,** Counsel, North Jersey Dist. Water Supply Com., 663 Main Ave., Passaic, N.J. (Jan. '43)

**Feitel, Ed. E.,** Pres. & Gen. Mgr., Water Works, Harvey, La. (Apr. '38) *MP*

**Fellers, Frank L.,** Supt., Water Dept., 422 Bonnardell Ave., Sebastopol, Calif. (Oct. '39) *M*

**Fenkell, George H.,** Almont, Mich. (June '20) *Trustee '26–'28. Vice-Pres. '30. President '31. Director '31–'32, '38–'41. Honorary M. '40.*

**Fenn, N. Frederick,** Chief Engr., South Bay Consolidated Water Co., Bay Shore, N.Y. (Nov. '27)

**Fenton, M. F.,** Mgr., Wailes Dove-Hermiston Corp., 659 E. Gage Ave., Los Angeles 1, Calif. (Dec. '32)

**Ferem, Walter,** Pres. & Gen. Mgr., The Walter Ferem Co., 112 W. 9th St., Los Angeles 15, Calif. (Jan. '40)

**Fergus Falls Water & Light Dept.,** Dow I. Sears, Supt., Fergus Falls, Minn. (Corp. M. July '38)

**Fergus, James,** Supt., West Newton Water Co., 126—1st St., West Newton, Pa. (July '43)

**Ferguson, G. H.,** Chief, Public Health Eng. Div., 225 Daly Bldg. Annex, MacKenzie Ave., Ottawa, Ont., Can. (Mar. '25) *P*

**Ferguson, George E.,** Dist. Engr., U.S. Geological Survey, Box 607, Ocala, Fla. (July '41)

**Ferguson, Gerald W.,** 80 Mountain Ave., Somerville, N.J. (Jan. '42) *P*

**Ferguson, J. B.,** 312 Washington St., Hagerstown, Md. (Sept. '19)

**Ferguson, S. F.,** Cons. Engr., 11 Hill St., Newark 2, N.J. (Apr. '37)

**Ferguson, S. F.,** 11 Hill St., Newark 2, N.J. (Assoc. M. Apr. '44)

**Fernandez y Simon, Abel,** Ing. Consultor, Ave. de la Republica No. 455, Havana, Cuba (Jan.'39)

**Ferzacca, V. J.,** *see* Pure Water Co., Inc.

**Fiedler, Albert G.,** Div. of Ground Water, U.S. Geological Survey, Washington 25, D.C. (Jan. '29) *Goodell Prize '39.*

**Field, H. L.,** Supt., Water Dept., Greenfield, Mass. (June '29)

**Field, Ross B.,** Jr. Civ. Engr. "A," Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (July '35) *P*

**Field, Wm. T.,** 20 Flower Bldg., Watertown, N.Y. (Apr. '10) ★

**Fiesler, Frederick A.,** 145 E. High St., Edwardsville, Ill. (Jan. '44) *MP*

**Filby, E. L.,** Black & Veatch, Cons. Engrs., 4706 Broadway, Kansas City 2, Mo. (Feb. '22) *P*

**Filipi, T. A.,** Director, Div. of Sanitation, State Dept. of Health, Lincoln 9, Neb. (Jan. '38)

**Finch, Lewis S.,** Prin. Asst. Engr., Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Oct. '33)

**Finch, Ronald M.,** Div. Mgr., Wallace & Tiernan Co., Inc., 416 Flour Exchange Bldg., Minneapolis 15, Minn. (May '25) *Fuller Award '42. P*

**Finck, Herbert F.,** *see* Ecusta Paper Corp.

**Findlan, John S.,** Comr. of Finance, Water Dept., City Hall, St. Paul, Minn. (Oct. '38)

**Fink, G. J.,** Research Assoc., National Lime Assn., 3620 Yuma St., N.W., Washington, D.C. (Apr. '24) *P*

**Finkbeiner, Carleton S.,** Cons. Engr., 1010 Home Bank Bldg., Toledo 4, Ohio (Jan. '38) *P*

**Finley, Lester,** Gen. Foreman, California Oregon Power Co., 1103 Upham St., Klamath Falls, Ore. (Jan. '41) ★

**Finley, T. R.,** Service Engr., Pittsburgh Equitable Meter Co., 1616 S. Delaney St., Orlando, Fla. (Jan. '44)

**Fire Underwriters Inspection Bureau,** Sanford Herberg, Engr., 1229 Plymouth Bldg., Minneapolis 2, Minn. (Corp. M. Feb. '24)

**Firestone Tire & Rubber Co.,** Chesley M. Williams, Mgr. of Power Dept., Akron 17, Ohio (Corp. M. Apr. '44)

**Firth, William J.,** Supervising Chemist & Supt. of Filtration, Dept. of Water Works, City Hall, Hammond, Ind. (Jan. '43) *P*

**Fischer, F. P.,** Sales Engr., Wallace & Tiernan Co., Inc., 811 Perry Payne Bldg., Cleveland 13, Ohio (July '37)

**Fischer, Joseph C.,** Chief Engr., Milwaukee County Institutions, Wauwatosa 13, Wis. (Apr. '42) *M*

**Fischer, N. J.,** Supt., Water & Light Dept., 302 Racine St., Jefferson, Wis. (Apr. '42) *M*

**Fiscus, David H.,** Div. Mgr., California Water & Telephone Co., 2130 Huntington Drive, San Marino 9, Calif. (Oct. '35)

**Fisher, Claude Edgar,** Engr., Water Service, Virginian Ry. Co., 1302½ Jefferson St., Roanoke, Va. (July '44)

**Fisher, Donald G.,** Sales Engr., Johns-Manville Corp., 195 Washington Ave., Memphis 3, Tenn. (Oct. '43)

**Fisher, Frank, Sr.,** Supt., Water Works, Clarence, Iowa (July '43)

**Fisher, Gerhard R.,** *see* Fisher Research Lab.

**Fisher, L. A.,** Supt., Board of Water & Light Comrs., Concord, N.C. (Jan. '14)

**Fisher, L. M.,** 857 U.S. Custom House, Chicago 7, Ill. (July '35) *P*

**Fisher Research Lab.,** Gerhard R. Fisher, Box 640, Palo Alto, Calif. (Assoc. M. July '38)

**Fishers Island Farms, Inc.,** Harold J. Baker, Fishers Island, N.Y. (Corp. M. May '30)

**Fishtein, Max,** 59 E. Van Buren St., Chicago 5, Ill. (Dec. '27) *M*

**Fisken, James B.,** 215 Waverly Pl., Spokane 13, Wash. (Jan. '42)

**Fitch, Harold A.,** Asst. San. Engr., Lake County, Courthouse, Painesville, Ohio (July '43) *MP*

**Fitzgerald, Gerald C.,** Civ. & Hydr. Engr., 625 Rowan Bldg., Los Angeles 13, Calif. (Apr. '29)

**Fitzgerald, Howard W.,** Chief Engr., Div. of Water, Buffalo, N.Y. (Apr. '23) *M*

**Fitzgerald, John L.,** Comr. & Vice-Pres., Passaic Valley Water Com., City Hall, Clifton, N.J. (Oct. '43)

**Fitzgerald, R. W.,** Supt., Div. of Water Supply, Norfolk 10, Va. (July '38) *MP*

**Fitz-Gibbons, G. J.,** Supt., Water Dept., Caledonia, N.Y. (Apr. '43) *M*

**Fitzmaurice, Patricio,** Supt., Abastecimiento de Aguas, Apartado Postal No. 306, San Luis Potosi, Mexico (Jan. '44)

**Fitzpatrick, Joseph W.,** Sales Repr., Ludlow Valve Mfg. Co., 420 R. A. Long Bldg., Kansas City 4, Mo. (Apr. '44)

**Five, Helge,** Administrative Headquarters, Long Island State Park Com., Babylon, N.Y. (Jan. '39)

**Fiveash, Charles E.,** Supt. of Plants, Water & Sewage Dept., City Hall, Fort Lauderdale, Fla. (July '39) *M*

**Flaa, Ingwald E.,** Hydr. Engr., San Francisco Water Dept., 425 Mason St., San Francisco 1, Calif. (May '15)

**Flack, Horace E.,** Exec., Dept. of Legislative Reference, City Hall, Baltimore, Md. (June '19)

**Flanagan, John C.,** Asst. Secy. & Registrar, Water Dept., St. Paul 2, Minn. (July '35) *A*

**Flanagan, Walter H.,** Sales Engr., Standard Lime & Stone Co., 630 N. Elm St., Greensboro, N.C. (July '40) ★

**Flanders, J. E.,** *see* New Rochelle Water Co.

**Flanders, W. C.,** Sales Mgr., Worthington Gamon Meter Co., 916 Lake St., Newark 4, N.J. (Oct. '35)

**Flannery, C. A.,** Lt. Col., Asst. Army Engr., Hq. Fourth Army, Fort Sam Houston, San Antonio, Tex. (Oct. '38) ★

**Fleming, Edward H.,** Supt., Mojave Div., Los Angeles Aqueduct, Mojave, Calif. (Oct. '34) *M*

**Fleming, J. O.,** Water & Street Supt., City Hall, West Monroe, La. (Jan. '43)

**Fleming, Julian R.,** Asst. Prof., Hydr. & San. Eng., Ferris Hall, Univ. of Tennessee, Knoxville, Tenn. (Jan. '41)

**Flentje, Martin E.,** 5 Hamilton Rd., Glen Ridge, N.J. (Mar. '26) *MP*

**Fletcher, Alex, Jr.,** 236 Outer Drive, Oak Ridge, Tenn. (Jan. '40)

**Fletcher, Alfred H.,** San. Engr., Johns Hopkins Univ., 615 N. Wolfe St., Baltimore, Md. (Jan. '36)

**Flexible Sewer Rod Equipment Co.,** H. R. Crane, 9059 Venice Blvd., Los Angeles 34, Calif. (Assoc. M. Jan. '38)

**Flint Water Dept.,** E. L. Holloway, City Hall, Flint, Mich. (Corp. M. Nov. '25)

**Flood, T. S.,** Chief Engr., Sawtooth Co., 710 Front St., Boise, Idaho (Apr. '44)

**Flook, Samuel E.,** Supt., Water Works Dept., Public Utilities Bldg., Port Arthur, Ont., Can. (Jan. '36)

**Florida Keys Aqueduct Com.,** Ernest A. Ramsey, Mgr., Key West, Fla. (Corp. M. Apr. '44)

**Flory, Harry E.,** Treas., Blue Mountain Consolidated Water Co., Nazareth, Pa. (Apr. '37) *A*

**Flotron, Leo F.,** Supt. of Water, 309 Municipal Bldg., Dayton 2, Ohio (July '42) *P*

**Flox Co., Inc., The,** C. S. Childs, Treas., 1409 Willow St., Minneapolis 4, Minn. (Assoc. M. Oct. '41)

**Flynn, Martin W.,** 203 Fifth Ave., Council Bluffs, Iowa (Jan. '44)

**Flynn, Stephen V.,** Staff Mgr., Transite Pipe Div., Johns-Manville Corp., 967 Broad St. Station Bldg., Philadelphia 3, Pa. (July '43)

**Foerster, Wm. K.,** Public Works Supt., City Hall, Escondido, Calif. (July '39) *M*

**Fogelman, Claude C.,** Secy.-Treas., Northampton Borough Munic. Authority, 2019 Main St., Northampton, Pa. (Apr. '44) *A*

**Foist, George M.,** Dist. Mgr., Public Service Co. of Indiana, Franklin, Ind. (Jan. '37)

**Folger, C. C.,** *see* Kingston Utilities Com.

**Foltz, A. V.,** Asst. Supt., Findlay Water Works, 110 N. Blanchard St., Findlay, Ohio (Apr. '39) *P*

**Foltz, Roger H.,** Supt., Filtration Plant, Water Dept., Lockport, N.Y. (Apr. '42) *MP*

**Fond du Lac City Water Dept.,** E. J. Braun, Supt., Fond du Lac, Wis. (Corp. M. May '19)

**Foote, Herbert B.,** Director, Div. of San. Eng., State Board of Health, Helena, Mont. (Aug. '23) *Director '31–'33. Fuller Award '42. P*

**Forbes, H. De B.,** Cons. Engr., Richmond, Ky. (Oct. '39)

**Ford, H. W.,** Pittsburgh-Des Moines Steel Co., 270 Broadway, New York 7, N.Y. (July '35)

**Ford, J. W.,** Supt. & Engr., San Jose Water Works, 374 W. Santa Clara St., San Jose 2, Calif. (Jan. '24) *M*

**Ford, John L.,** *see* Ford Meter Box Co., Inc., The

**Ford Meter Box Co., Inc., The,** John L. Ford, Secy.-Treas., Wabash, Ind. (Assoc. M. May '08)

**Ford, Richard V.,** Vice-Pres., The Ford Meter Box Co., Inc., 718 Redman Ave., Haddonfield, N.J. (July '42) ★

**Ford, Walter A.,** Supt., Cortland Water Board, Cortland, N.Y. (Jan. '36)

**Ford, Wilbur E.,** Wabash, Ind. (July '35)

**Fore, Clifford,** Supt., Munic. Water Works & Sewage Treatment, Carbondale, Ill. (Jan. '37) *M*

**Foreman, Charles S.,** Pres., C. S. Foreman Co., 841 New York Life Bldg., Kansas City 6, Mo. (June '20)

**Foreman, Merle S.,** Bacteriologist & Chemist, State Board of Health, 825 Cragmont Ave., Berkeley 8, Calif. (Jan. '28) *P*

**Forest City Water Works,** B. B. Green, Supt., Forest City, N.C. (Corp. M. Oct. '42)

**Forest Hill Water Works System,** N. MacNicol, Comr. of Works, 333 Lonsdale Rd., Toronto 10, Ont., Can. (Corp. M. Apr. '42)

**Forgey, Carl S.,** Technical Div., East Bay Munic. Utility Dist., 512—16th St., Oakland 12, Calif. (June '33) *M*

**Forni, George P.,** 1379—62nd St., Emeryville, Calif. (Assoc. M. Oct. '42)

**Forrest, T. C., Jr.,** Cons. Engr., Praetorian Bldg., Dallas 1, Tex. (Oct. '39)

**Forsberg, Ole,** Chemist, Oliver Iron Mining Co., Hibbing, Minn. (Mar. '21) *Director '33–'36. P*

**Forster, Cyril,** Mgr., Palmerston Public Utilities, Box 87, Palmerston, Ont., Can. (Jan. '40) *M*

**Fort Collins, City of,** Burgis G. Coy, City Engr., City Hall, Fort Collins, Colo. (Corp. M. Mar. '26)

**Fort Dodge Water Dept.,** John W. Pray, Mgr., Munic. Utilities, Fort Dodge, Iowa (Corp. M. Jan. '43)

**Fortin, Joseph O.,** Supt. of Water & Sewers, Glen Ellyn, Ill. (July '42) *M*

**Foster, Charles,** 316 Medical Arts Bldg., Duluth 2, Minn. (June '19)

**Foster, H. E.,** *see* Dunnville Public Utilities Com.

**Foster, Herbert B., Jr.,** 1946 Torrey Pines Rd., La Jolla, Calif. (Oct. '39) ★

**Foster, Lloyd H.,** Foreman, Meter Dept., Div. of Water, 565 N. Erie St., Toledo, Ohio (July '44)

**Foster, William S.,** Eng. Editor, *The American City*, 470 Fourth Ave., New York, N.Y. (Apr. '42) ★

**Foulds, Henry W.,** Vice-Pres., The Permutit Co., 330 W. 42nd St., New York 18, N.Y. (July '40) *P*

**Foulk, C. W.,** Prof. of Anal. Chem., Ohio State Univ., Columbus, Ohio (June '26)

**Fowler, Arthur G.,** *see* Celanese Corp. of America

**Fowler, Edward A.,** 366 Pine St., New Orleans 18, La. (Apr. '10) *M*

**Fowler, H. D.,** Civ. Engr., Box 3084, Seattle 14, Wash. (July '36)

**Fowler, James D.,** Cons. Engr., 701 Great National Life Bldg., Dallas 1, Tex. (July '35) *P*

**Fox, Chas. L.,** Pennsylvania Water Co., 712 South Ave., Wilkinsburg 21, Pa. (June '12) *MP*

**Fox, J. E.,** City Engr., City Hall, Wooster, Ohio (Jan. '42)

**Fox, Jeff S.,** Box 247, El Dorado, Ark. (July '42) *P*

**Fox, Lloyd F.,** Chemist, Metropolitan Water Dist., 169 E. Pasadena St., Pomona, Calif. (Oct. '43) *P*

**Fox, Robert H.,** Box 118, Centerville, Ohio (Affil. Jan. '41) *M*

**Fox, Robert M.,** Prof. of Civ. Eng., Univ. of Southern California, Los Angeles 7, Calif. (Jan. '37)

**Foxboro Co., The,** C. Schwarzler, Mgr., Sales Promotion, Neponset Ave., Foxboro, Mass. (Assoc. M Jan. '37)

**Frame, Paul D.,** Pres., Ulrich Chemical Co., 31 E. Georgia St., Indianapolis 4, Ind. (Dec. '37) ★

**Francis, George Walden,** Cons. Engr. & Mgr., The Francis Engineering Co., 303 Eddy Bldg., Saginaw, Mich. (Apr. '38) *MP*

**Francis, James G.,** Civ. Engr., 570 N. Arden Blvd., Los Angeles 4, Calif. (Oct. '31) *M*

**Frank, J. A.,** Engr., National Water Main Cleaning Co., 190 Euclid Ave., Hackensack, N.J. (Oct. '40)

**Frank, O. B.,** Mgr., Conservative Water Co., 8627 Fir St., Los Angeles 2, Calif. (July '35) *M*

**Franklin, James W.,** Chief Clerk, Major Constr. Div., Los Angeles Dept. of Water & Power, 4213 Rhodes Ave., North Hollywood, Calif. (July '42) ★

**Franklin Square Water Com.,** Thomas H. Le Roy, Chairman, Board of Water Comrs., Franklin Square, Nassau County, N.Y. (Corp. M. July '41)

**Franklin, W. M.,** Box 3162 Dilworth Station, Charlotte, N.C. (July '35) *Fuller Award '43.*

**Franz, Edwin F.,** 2508 Meadow Rd., Louisville 5, Ky. (Oct. '39) ★

**Fraschina, Keeno,** Richmond-Sunset Sewage Treatment Plant, 4545 Lincoln Way, San Francisco 22, Calif. (Jan. '39)

**Fraser Cement Products Co.,** R. J. Fraser Jr., 3020 Andrita St., Los Angeles 41, Calif. (Assoc. M. Oct. '38)

**Fraser, R. J., Jr.,** *see* Fraser Cement Products Co.

**Fraser, William A.,** Flint Lake Water Co., Blackhawk Beach, Valparaiso, Ind. (Oct. '41) *A*

**Frazier, Ernest,** Supt., Water Works, Greenfield, Ind. (Apr. '44)

**Frazier, Henry L.,** *see* Opalco Lab.

**Frazier, Irvin,** Salesman, Hays Mfg. Co., 509 Shenley Drive, Erie, Pa. (July '44) *M*

**Frazza, Louis F.,** 225 Bamford Ave., Hawthorne, N.J. (Oct. '39) *MP*

**Frederick, V. W.,** *see* Libbey-Owens-Ford Glass Co.

**Freeburn, H. M.,** Chief Engr., Philadelphia Suburban Water Co., 1251 Montgomery Ave., Wynnewood, Pa. (May '22) *MP*

**Freeland, B. H.,** Supt. of Utilities, Munic. Light & Water Works, Bluffton, Ind. (Oct. '41)

**Freeman, Robert B.,** Asst. to Chief Engr., American Water Works & Elec. Co., 50 Broad St., New York 4, N.Y. (July '43) *M*

**Freese, S. W.,** Freese & Nichols, Hydr. & San. Engrs., 407 Capps Bldg., Fort Worth 2, Tex. (Oct. '41) *P*

**Freiberger, Wm. J.,** Supt., Sylvan Spring Water Co., Sylvan Beach, Oneida County, N.Y. (Jan. '38) *P*

**French, Dudley K.,** 503 Hawthorne Lane, Winnetka, Ill. (May '19)

**French, E. V.,** Mech. Engr., 60 Batterymarch St., Boston 1, Mass. (July '06)

**French, L. M.,** Supt., City Water Dept., 239—16th St., Paso Robles, Calif. (July '43)

**Fresno City Water Dept.,** Claude H. Weekes, Supt., 2326 Fresno St., Box 512, Fresno 9, Calif. (Corp. M. Jan. '32)

**Frick, A. L., Jr.,** Asst. Div. Mgr., Wallace & Tiernan Sales Corp., 2311 E. 8th St., Los Angeles 21, Calif. (July '37) *P*

**Frick, Daniel F.,** San. Engr., Dept. of San. Eng., State Board of Health, 418 Wade Hampton Office Bldg., Columbia 10, S.C. (Jan. '43)

**Fricker, Emile J.,** Vice-Pres., Hackensack Water Co., 4100 Park Ave., Weehawken, N.J. (Mar. '25)

**Friedman, Samuel,** Chemist, Catskill Lab., Ashokan, N.Y. (Nov. '29)

**Friedman, William M., Jr.,** Jr. San Engr., State Dept. of Health, 65 Court St., Buffalo 2, N.Y. (July '43)

**Friel, Francis S.,** Albright & Friel, Inc., 1520 Locust St., Philadelphia 2, Pa. (Mar. '26) *P*

**Friese, John H.,** Asst. Engr., City of White Plains, 255 Main St., White Plains, N.Y. (Affil. Jan. '39) ★

**Frisk, Paul W.,** 2831—28th St., N.W., Woodley Manor, Washington 8, D.C. (Mar. '29) *Director '37–'40.*

**Frith, Gilbert R.,** Asst. Engr., Div. of San. Eng., State Board of Health, Atlanta 3, Ga. (July '37) *P* ★

**Fritz, William G.,** Contractor, West Orange, N.J. (May '24)

**Froehde, F. C.,** *see* Pomona Water Dept.

**Fry, James H.,** Chief Chemist, Filtration Plant, R.R. No. 1, Lebanon Rd., Nashville 10, Tenn. (July '34) *MP*

**Fry, Kenneth H.,** Supt., Water Dept., Box 58, Hayward, Calif. (Oct. '41)

**Frye, Horace R.,** Supt., Water Dept., Sheridan Rd. & Lincoln St., Evanston, Ill. (Mar. '34) *P*

**Frye, Stanley C.,** Supt., Water Dept., City Hall Bldg., Jackson, Tenn. (June '30) *M*

**Fugate, G. L.,** Chief Designing Engr., Dept. of Utilities, San Jacinto River Water Supply Div., 631 Harvard St., Houston 7, Tex. (Oct. '38)

**Fulkerson, Paul G.,** Chief Chemist, Filtration Plant, City Utilities, 1233 Cora Ave., Fort Wayne 3, Ind. (Apr. '43) *P*

**Fulkman, John A.,** Water Supply Engr., Consoer, Townsend & Assoc., 125 Blackstone Ave., La Grange 6, Ill. (July '28) *P*

**Fuller, George B.,** Mgr., Public Utilities Com., Watford, Ont., Can. (Jan. '37) *M*

**Fuller, H. L.,** Civ. Engr., Equipment Engr., Pratt & Whitney, 420 E. 73rd Terrace, Kansas City 5, Mo. (July '42) *M*

**Fuller, Harry U.,** Chief Engr., Portland Water Dist., 16 Casco St., Portland 2, Me. (Aug. '32)

**Fuller, N. M.,** *see* Olean Water Dept.

**Fuller, Raymond H.,** 2201 N. 4th St., Columbus 1, Ohio (Jan. '44) *M*

**Fulton, Angus Anderson,** Hydr. Engr., Scotland Hydro-Elec. Board, Edinburgh, Scotland (Oct. '37)

**Furman, Robert W.,** 1443 Kenyon Drive, Toledo 9, Ohio (May '22)

**Gaffney, L. V.,** Supt., Water Dept., Gaffney, S.C. (July '38)

**Gahn, Harry A.,** Supt., Water Plant, Fort Pierce, Fla. (July '39)

**Gaither, Thos. E.,** Sales Repr., Mueller Co., 263 E. Walnut St., Marion, Ohio (Jan. '43)

**Galesburg Water Dept.,** R. E. Graham, Supt., City Hall, Galesburg, Ill. (Corp. M. July '41)

**Galimbert, George M.,** Sr. San. Engr., Ontario Dept. of Health, 117 Everden Rd., Toronto, Ont., Can. (Jan. '43)

**Gallagher, J. A.,** Supt., Water Dept., City Hall, Corvallis, Ore. (Jan. '40)

**Gallaher, William U.,** Box 252, Appleton, Wis. (Mar. '25) *Fuller Award '43.*

**Galloway, George M.,** Layne-Northwest Co., 709 N. 11th St., Milwaukee 3, Wis. (Jan. '42) *M*

**Galloway, James L.,** *see* Marysville Water Dept.

**Gananoque Water Works Com.,** N. R. Gardner, Supt., Gananoque, Ont., Can. (Corp. M. Mar. '27)

**Gannett, Farley,** Pres., Gannett, Eastman & Fleming, Inc., Harrisburg, Pa. (Jan. '35)

**Garber, Henry E.,** Asst. Engr., State Board of Health, 1134—9th Ave., Helena, Mont. (Jan. '42) *MP*

**Garcia, R. F.,** *see* Central Foundry Co.

**Garcia-Montes, Jose, Jr.,** Civ. Engr., Ave. de Belgica No. 4, Havana, Cuba (Jan. '36) *Director '41–'42.*

**Gard, Charles M.,** R. R. No. 3, Poughkeepsie, N.Y. (Oct. '41) *MP*

**Garden City, Inc. Village of,** A. H. Rogers, Supt. of Public Works, 110 Seventh St., Garden City, N.Y. (Corp. M. Apr. '40)

**Gardner, Charles W.,** Draftsman, Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '43)

**Gardner, Clarke,** Supt. of Water Dept. & City Engr., Dept. of Public Works, Salisbury, Md. (July '36) *M*

**Gardner, Joe H.,** 1401 Jefferson Davis Highway, Arlington, Va. (Apr. '37) ★

**Gardner, Leigh O.,** Designing Engr., 215 S. 22nd Ave., Phoenix, Ariz. (Oct. '42)

**Gardner, N. R.,** *see* Gananoque Water Works Com.

**Gardner, Ruskin T.,** Div. Engr., Wallace & Tiernan Sales Corp., 2311 E. 8th St., Los Angeles 21, Calif. (Oct. '43) *P*

**Gare, Leland R.,** *see* Ecorse, City of

**Garland, Chesley F.,** Asst. San. Engr., Bureau of San. Eng., State Board of Health, Jacksonville, Fla. (Jan. '42) ★

**Garman, Glen J.,** *see* La Fayette Water Works

**Garman, H. O.,** Cons. Engr., 803 K. of P. Bldg., Indianapolis 4, Ind. (May '16) *A*

**Garner, C. C.,** Supt. of Water Works, Laurens, Iowa (Apr. '40)

**Garner, Herman,** Supt., Benton Water Dept., 519 N. Main St., Benton, Ill. (Jan. '42)

**Garnett, George W.,** *see* Port Hope Water Works Com.

**Garratt, James Ernest,** Designing Engr., Div. of Water, 101 City Hall Annex, Newark 2, N.J. (May '30) *M*

**Garratt, Willis E.,** Mgr., Rogers City Elec. Light & Power Co., Rogers City, Mich. (Apr. '42) *AM*

**Garrett, G. H.,** Gen. Mgr., Thompson Pipe & Steel Co., Box 2369, Denver 1, Colo. (July '39)

**Garrett, G. S.,** *see* American Water Softener Co.

**Garrett, Jno. L.,** Supt., City Water Dept., Minden, La. (Oct. '42)

**Garrison, K. M.,** *see* Goodrich, B. F., Co.

**Garrison, Walter L.,** Supt., Keokuk Munic. Water Works, 27 N. 5th St., Keokuk, Iowa (Oct. '41) *M*

**Garrity, Leo V.,** Asst. Gen. Supt., Dept. of Water Supply, 16803 Shaftsbury Rd., Detroit, Mich. (July '40)

**Garvin, A. G.,** *see* Suburban Water Co. (Verona)

**Gasell, J. A.,** City Engr., City Water Dept., City Hall, Jackson, Tenn. (Oct. '40)

**Gaspard, August,** Supervisor of Plumbing, Sewerage & Water Board, 526 Carondelet St., New Orleans 12, La. (July '37)

**Gass, G. M.,** Sales Mgr., National Iron Corp., Ltd., 324 Cherry St., Toronto 2, Ont., Can. (Jan. '42)

**Gasser, Clemont E.,** Supt., City of St. Petersburg, 4720—4th Ave., N., St. Petersburg 6, Fla. (Jan. '44) *M*

**Gastonia, City of,** Robert Van Sleen, Supt. of Utilities, City Hall, Gastonia, N.C. (Corp. M. Oct. '42)

**Gates, A. J.,** Supt. & Engr., Water Dept., Municipal Auditorium, Wichita Falls, Tex. (Oct. '43)

**Gatley, Harold K.,** Cons. Engr., 26 Berkeley Rd., Maplewood, N.J. (Jan. '44)

**Gaudin, E. L.,** Sales Engr., Matheison Alkali Works, Inc., 334 Dixie Terminal Bldg., Cincinnati 2, Ohio (Apr. '44) *P*

**Gauer, Paul G.,** Chief Engr., City Water Dept., 311 N. Hancock St., Madison 3, Wis. (May '30) *M*

**Gausmann, Roy W.,** 405 W. 23rd St., New York, N.Y. (Mar. '24)

**Gauthier, C. W.,** Supt., Water Dept., Belle River, Ont., Can. (Jan. '38)

**Gauthier, R. J.,** *see* Penetanguishene Water & Light Com.

**Gavett, Weston,** San. & Hydr. Engr., 973 Kenyon Ave., Plainfield, N.J. (Nov. '14) *P*

**Gayton, Loran D.,** Asst. City Engr., 402 City Hall, Chicago 2, Ill. (Oct. '24)

**Gearhart, J. N.,** City Engr., Coquille, Ore. (Jan. '41)

**Gearhart, John C.,** Engr., Stevens & Koon, 1203 Spalding Bldg., Portland 4, Ore. (Jan. '39) ★

**Gebhardt, Robert E.,** 65 Stephen Ave., New Hyde Park, N.Y. (Apr. '43) *M*

**Gebhart, Earl,** Supt., Middletown Water Works, 116 Baltimore St., Middletown 21, Ohio (Apr. '39) *M*

**Gedge, F. G.,** Supervisor, Wyoming Water Works, 500 Grove Ave., Wyoming, Cincinnati 15, Ohio (Apr. '42) *M*

**Gehm, Harry W.,** *see* National Council for Stream Improvement of Paper, Pulp & Paperboard Industries

**Gehrig, George L.,** *see* Manhasset-Lakeville Water Dist.

**Geisler, Paul W.,** Sales Engr., Alco Products Div., 30 Church St., New York 8, N.Y. (Apr. '37)

**Gelston, W. R.,** Supt., Water Works Com., 415 Hampshire St., Quincy, Ill. (Jan. '42) *Director '33–'36. MP*

**General Chemical Co.,** L. I. Birdsall, 3357 W. 47th Pl., Chicago 32, Ill. (Assoc. M. June '02)

**General Utilities Co., Ltd.,** A. L. Murray, Mng. Director, 1029 Marine Bldg., Vancouver, B.C., Can. (Corp. M. Jan. '38)

**Geneseo Water Works,** E. M. DeMunn, Supt., Geneseo, N.Y. (Corp. M. Apr. '44)

**Gentner, Warren A.,** Spec. Deputy Mgr. & Spec. Deputy Chief Engr., Water Bureau, 1026 Main St., Hartford 3, Conn. (Jan. '42) *AM*

**Genzmer, Paul R.,** *see* Greenport Water Dist. No. 1

**George, B. J.,** Indus. Engr., Kansas City Power & Light Co., 1330 Baltimore Ave., Box 679, Kansas City 10, Mo. (Apr. '44) *M*

**George, J. M.,** Supt., Light & Water Dept., Thomaston, Ga. (Jan. '34)

**George, William O.,** Assoc. Geologist, U.S. Geological Survey, 302 W. 15th St., Austin 14, Tex. (Dec. '43) *MP*

**Georgeff, Steven,** Supt. of Water Dept., L'Anse, Mich. (July '44)

**Georgia, F. R.,** San. Chemist, Cornell Univ. Filter Plant, Forest Home, Ithaca, N.Y. (May '19) *P*

**Gerardy, Maurice N.,** Sr. Assoc. Civ. Engr. of Hydraulics, Dept. of Water Supply, Water Board Bldg., Detroit 26, Mich. (Mar. '22)

**Gerber, Henry M.,** *see* Louisville Water Co.

**Gerber, Winfred D.,** 406 Florida St., Urbana, Ill. (Apr. '29) *Fuller Award '44. P*

**Germann, Ernest,** Comr., Board of Water Comrs., 823 Murray St., Elizabeth 2, N.J. (Oct. '43)

**Germond, Earl,** Dist. Mgr., Wallace & Tiernan Co., Inc., 315 Grove St., Montclair, N.J. (Jan. '44) *P*

**Gerstacker, Hans,** Operation Foreman, Deer Lodge Water Dept., Box 246, Deer Lodge, Mont. (July '35) *MP*

**Gerstein, H. H.,** San. Engr., Dept. of Public Works, City Hall, Chicago, Ill. (Dec. '25) *P* ★

**Gettrust, J. S.,** Supt., Purif. & Pumping, Akron Water Works, Kent, Ohio (June '21)

**Getz, John G.,** Pres., Northern Illinois Water Corp., 105 W. Adams St., Chicago, Ill. (Jan. '39)

**Geupel, Louis A.,** 4012 Edwards St., N.W., Washington, D.C. (Nov. '22) *MP*

**Geyer, John C.,** Latrobe Hall, Johns Hopkins Univ., Homewood, Baltimore, Md. (Oct. '34) ★

**Ghiotto, Louis A.,** Supt. of Pipe Constr., Bureau of Water Works & Supply, 4337 Finley Ave., Los Angeles, Calif. (Apr. '36)

**Giacomazzi, P. A.,** Supt. of Pipe Constr. & Maint., Santa Paula Water Works, Santa Paula, Calif. (Nov. '23) *MP*

**Gibbons, Edward Vincent,** Chief Chemist, Sternson Labs., Ltd., Brantford, Ont., Can. (Jan. '42)

**Gibbons, Mortimer M.,** Box 162, Rahway, N.J. (Nov. '22)

**Gibbs, Fred S.,** N.E. Mgr.-San. Engr., Wallace & Tiernan Co., Inc., 346A Newbury St., Boston 15, Mass. (July '41) *P*

**Gibbs, William O.,** Supt., California Water & Telephone Co., 19 W. 9th St., National City, Calif. (July '44) *MP*

**Gibney, Wm. J.,** 72 Brantwood Rd., Snyder, Buffalo, N.Y. (July '40)

**Gibson, E. W.,** Mgr., Oregon Culvert & Pipe Co., 2321 S.E. Gladstone St., Portland 2, Ore. (Jan. '35)

**Gibson, James E.,** Mgr. & Engr., Water Dept., 14 George St., Charleston Box 829-A, S.C. (May '22) *Trustee '25–'26. Vice-Pres. '27. President '28. Diven Medal '29. Exec. Com. '29–'30. Director '30–'31. Honorary M. '40. Fuller Award '41. AMP*

**Gibson, W. B.,** Box 1866, Fort Myers, Fla. (Oct. '37) *Fuller Award '42.*

**Gibson, William C.,** Capt., Sn.C., Station Dispensary, Persidio of San Francisco, Calif. (Apr. '44) *P* ★

**Gibson, William R.,** San. Engr., 122 Elliott Ave., W., Seattle 99, Wash. (Jan. '38) *P*

**Gidley, Harry K.,** Assoc. Engr., State Health Dept., Charleston, W.Va. (Affil. Jan. '39)

**Gierlich, Oswald A.,** City Engr. & Water Supt., Water Dept., Manhattan Beach, Calif. (July '43) *M*

**Gifft, Howard M.,** Assoc. Prof., San. Eng., Cornell Univ., Ithaca, N.Y. (Apr. '43) *P*

**Gilbert, Joseph J.,** San. Engr., 201 Wheatsheaf Lane, Abington, Pa. (July '37) ★

**Gilbertson, Wesley E.,** Asst. San. Engr., U.S. Public Health Service, 605 Volunteer Bldg., Atlanta, Ga. (Jan. '41)

**Gilcreas, F. Wellington,** Asst. Director in Charge of Labs. for San. & Anal. Chem., Div. of Labs. & Research, State Dept. of Health, New Scotland Ave., Albany 1, N.Y. (Apr. '24) *P*

**Gilcrest, R. V.,** Supt., Water Works, Carlyle, Ill. (Apr. '43)

**Gilkison, Geo. F.,** Supt. of Water & Sewage, Kansas Ordnance Plant, Parsons, Kan. (Apr. '20) *P*

**Gill, John Buckner,** Spec. Repr., Johns-Manville Sales Corp., 116 New Montgomery St., San Francisco 5, Calif. (Jan. '40) *M*

**Gill, Joseph E.,** Prin. Asst. Engr., Bureau of Water, 802 City Hall Annex, Philadelphia 7, Pa. (Apr. '42) *P*

**Gill, L. M.,** *see* Darco Corp.

**Gill, Sidney R.,** Northwest Dist. Sales Mgr., Northwest Lead Co., 2700—16th Ave., S.W., Seattle 4, Wash. (July '43) *M*

**Gillespie, C. G.,** Chief, Bureau of San. Eng., State Dept. of Public Health, 15 Shattuck Sq., Berkeley 4, Calif. (June '11) *P*

**Gillespie, Robert N.,** Chief Engr., Cement Gun Co., Inc., 1520 Walnut St., Allentown, Pa. (Apr. '43)

**Gillespie, Wylie W.,** Smith & Gillespie, Engrs., Box 466, Panama City, Fla. (July '41)

**Gilman, Harry,** Toxicologist, 1802 Overton Rd., Huntsville, Ala. (Apr. '43) *P*

**Gilman, N. A.,** City Water Supt., Yakima, Wash. (June '34) *M*

**Gilstrap, J. R.,** Supt., Water & Sewer Depts., Box 24, Haskell, Tex. (Oct. '39)

**Girdwood, A. R.,** *see* Shenango Valley Water Co.

**Glace, I. M.,** Cons. Engr., 22 S. 22nd St., Harrisburg, Pa. (Nov. '21) *Fuller Award '41. Director '42–'45.*

**Glace, I. M., Jr.,** Designing Engr., J. N. Pease & Co., Johnston Bldg., Charlotte, N.C. (Jan. '42) ★

**Glamorgan Pipe & Foundry Co.,** W. W. Winfree, Lynchburg, Va. (Assoc. M. Nov. '07)

**Glass, John R.,** Research Chemist, Wallace & Tiernan Co., Inc., 11 Mill St., Belleville, N.J. (Jan. '44) *Goodell Prize '44. P*

**Glass, W. A.,** *see* Miami Dept. of Water & Sewers

**Glassbrook, E. F.,** Mgr., Public Utilities California Corp., Niles, Calif. (Apr. '30) *M*

**Gleeson, George H.,** 400 N. Lexington Ave., Pittsburgh, Pa. (July '40)

**Glen Ridge Water Dept.,** A. F. Eschenfelder, Borough Engr. & Supt. of Water Dept., Glen Ridge, N.J. (Corp. M. Oct. '22)

**Glendale Public Service Dept.,** Peter Diederich, Supt., 119 N. Glendale Ave., Glendale 6, Calif. (Corp. M. Dec. '14)

**Glendora Water Dept.,** Fred Lowry, City Clerk, City Hall, Glendora, Calif. (Corp. M. Jan. '43)

**Glenn, James L.,** 7 Covington Meadows, Clayton, Mo. (July '42)

**Glens Falls Board of Water Comrs.,** Ernest L. H. Meyer, Supt., Glens Falls, N.Y. (Corp. M. Oct. '18)

**Glick, Dudley Peters,** Director, Div. of Labs., Akron Health Dept., 708 Municipal Bldg., Akron 8, Ohio (Apr. '43) *P*

**Glidden, A. Leland,** Pres., New Canaan Water Co., New Canaan, Conn. (July '35) ★

**Glover, W. Wayne,** Asst. Chief Engr., Simplex Valve & Meter Co., 1037 Belfield Ave., Drexel Hill, Pa. (Jan. '42)

**Gloversville Water Works,** W. F. Davies, Supt., 19 W. Fulton St., Gloversville, N.Y. (Corp. M. Jan. '43)

**Glynn, W. J.,** 98 Frazier St., Brockport, N.Y. (July '35)

**Goddin, Norman L.,** Mgr., Water Dept., Ashland, Va. (Apr. '43) *M*

**Godet, Henry,** Office Mgr. & Secy., Board of Water Comrs., Water Dept., City Hall, East Orange, N.J. (Affil. Oct. '38) *A*

**Godwin, George H.,** Mgr., Water Dept. Box 1066, Decatur, Ala. (Apr. '36) *M*

**Godwin, Harold E.,** Chief Operator, State Hospital, Woodward, Iowa (July '44)

**Goebel, Frank H.,** *see* Grand Rapids Water Dept.

**Goehring, Edwin C.,** Water Treatment Supt., Technician & Asst. Mgr., Beaver Falls Munic. Authority, 1112—3rd Ave., New Brighton, Pa. (Apr. '39) *P*

**Goetz, John A.,** Supt., Water Dept., Mattoon, Ill. (Apr. '38) *M*

**Goff, M. H.,** *see* Milford Water Co.

**Goff, William A.,** Cons. Engr., Broad Street Station Bldg., Philadelphia 3, Pa. (July '37) *MP*

**Goit, Laurance E.,** Asst. Chief Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34) *Goodell Prize '37. M*

**Gold, Donald D.,** Chemist & Bacteriologist, Filtration Plant, R. No. 4, Dayton's Bluff P.O., St. Paul, Minn. (Jan. '43)

**Golden, A. T.,** Water Treatment Plant Operator, Los Angeles Dept. of Water & Power, 16931 Sherman Way, Van Nuys, Calif. (Apr. '33)

**Golden, George,** Supt., 30 Gerald Ave., Highland Park 3, Mich. (Jan. '38)

**Golden-Anderson Valve Specialty Co.,** J. A. Voland, Gen. Mgr., 1315 Fulton Bldg., Pittsburgh, Pa. (Assoc. M. Oct. '34)

**Golder, Hugh C.,** Technical Mgr., Economic Water Softeners, Ltd., Warwick Road, Greet, Birmingham 11, England (July '37)

**Goldman, Ernst E.,** Engr., 401 Eddy St., Ithaca, N.Y. (Apr. '44) *P*

**Goldsboro, City of,** G. E. Whitman, Supt. of Water Dept., City Hall, Goldsboro, N.C. (Corp. M. Jan. '43)

**Goldsborough, Donald H.,** Assoc. Civ. Engr., Bureau of Water Supply, 1904 Homewood Ave., Baltimore 18, Md. (July '42) *M*

**Goldsmith, Clarence,** National Board of Fire Underwriters, 222 W. Adams St., Chicago, Ill. (Dec. '15)

**Goldsworthy, C. M.,** Mgr., California Water & Telephone Co., 439 Tyler St., Monterey, Calif. (Oct. '38) *M*

**Gooch, E. W.,** Water Comr., Water Dept., City Hall, 210 Lottie St., Bellingham, Wash. (Affil. Apr. '40) *P*

**Gooch, W. T.,** Prof. of Chem., Baylor Univ., & Chemist, Waco City Water Works, 808 Speight Ave., Waco, Tex. (Apr. '25) *P*

**Good, Timothy W.,** Supt., Water Works, City Hall, Cambridge 39, Mass. (Feb. '20)

**Goodell, J. E.,** Chemist, Old City Hall Bldg., Lancaster, Pa. (Apr. '24)

**Gooding, Gerald J.,** 77 Hamilton Ave., New Rochelle, N.Y. (June '30)

**Goodman, Adolph E.,** Assoc. Engr., Bureau of Water Supply, 120 Sage Ave., Akron, Ohio (Apr. '39)

**Goodnight, V. L.,** City Engr., City Hall, Corvallis, Ore. (Apr. '43)

**Goodrich, B. F., Co.,** K. M. Garrison, Water Chemist, 532 Vinita St., Akron, Ohio (Corp. M. Oct. '43)

**Goodrich, B. F., Co.—Agent for Rubber Reserve Co.,** F. V. Morrison, Steam & Water Dept., Port Neches, Tex. (Corp. M. July '44)

**Goodspeed, Richard C.,** Pres. & Gen. Mgr., East Pasadena Water Co., Ltd., 1715 Fair Oaks Ave., South Pasadena, Calif. (July '37) *AM*

**Goodwin, James W.,** Cons. Engr., J. W. Goodwin Engineering Co., 1244 Martin Bldg., Birmingham 3, Ala. (Jan. '40) *MP*

**Goodwyn, P. A.,** *see* Bristol, Va., City of

**Gordon, F. G.,** 6437 Woodlawn Ave., Chicago 37, Ill. (June '21)

**Gordon, Fred F.,** Cons. Engr., 1200 Park Ave., Rochester 10, N.Y. (July '35) *P*

**Gordon, J. G.,** *see* Layne & Bowler, Inc.

**Gordon, Jack,** Supt., Rochester Water Dept., Rochester, Ind. (Oct. '39)

**Gordon, Milton O.,** 26 Montana St., Worcester, Mass. (Jan. '44)

**Gordon, Murray L.,** Town Engr., Box 95, Truro, N.S., Can. (Jan. '37) *M*

**Gordy, Fred,** Mgr., Conway Corp., Conway, Ark. (Jan. '43)

**Gorman, Arthur E.,** 2231 California St., N.W., Washington 8, D.C. (Mar. '24) *Diven Medal '27. MP*

**Gorman, Richard C., Jr.,** 44 Genesee St., Hornell, N.Y. (May '29) *MP*

**Gosney, B. C.,** Supt., City Water Dept., Auburn, Wash. (July '38) *M*

**Gotaas, Harold B.,** Chief Engr., Office of Co-ordinator of Inter-American Affairs, Dept. of Commerce Bldg., Washington, D.C. (Jan. '38) *P* ★

**Goudey, Ray F.,** San. Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Apr. '18) *Fuller Award '40. Goodell Prize '42. P*

**Gouge, Charles C.,** 1119 Star St., Bonham, Tex. (Apr. '42) ★

**Gouin, Paul,** Supt. of Filtration Plant, 28 Martin St., Dorval, Que., Can. (Apr. '41)

**Gould, Harry W.,** Supt., Pumping Station, Water Works Park, Detroit, Mich. (Jan. '30)

**Grabb, George W.,** Water Works Supt., Chesley, Ont., Can. (Mar. '32)

**Grady, Robert H.,** 1305 Colonial Rd., Raleigh, N.C. (Jan. '40) ★

**Graf, August V.,** Chief Chem. Engr., Water Purif. Plants, Howard Bend Station, Chesterfield, Mo. (June '14) *Fuller Award '40. P*

**Graf, Walter W.,** Technical Supervisor, Lancaster Munic. Water Works, Municipal Bldg., Lancaster, Ohio (Apr. '43) *M*

**Graham, D. W.,** Chief Chemist, Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Jan. '38) *P*

**Graham, Howard E.,** Water Service Inspector, Illinois Central System, 135 E. 11th Pl., Chicago, Ill. (Oct. '43)

**Graham, R. E.,** *see* Galesburg Water Dept.

**Gram, A. L.,** Exec. Secy., Metropolitan Water Dist. of Southern California, 1870 Los Robles Ave., San Marino 9, Calif. (Jan. '37) *MP*

**Gran, John E.,** School of Chem., Univ. of Alabama, University, Ala. (Apr. '38) *MP*

**Granberry, Pat H.,** Supt., Water Works, De Ridder Army Air Base, R.F.D. 2, De Ridder, La. (Oct. '43)

**Grand Rapids Water Dept.,** Frank H. Goebel, Public Service Director, Grand Rapids 2, Mich. (Corp. M. Feb. '13)

**Granda y Deben, Robel,** San. Engr., Public Health Service, Estrada Palama 214 esq. a Concejal Veiga, Vibora, Havana, Cuba (July '38)

**Grant, Burton S.,** Engr., Los Angeles Aqueduct, Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34) *M*

**Grant, Donald K.,** Dist. Mgr., Rusta Restor Corp., 2854 N. Summit Ave., Milwaukee 11, Wis. (Apr. '42)

**Grant, S. L.,** Supt., Water & Sewer Dept., Winchester, Va. (July '35)

**Grant, W. K.,** Munic. Engr., Louisiana Fire Prevention Bureau, 609 Canal Bank Bldg., New Orleans 12, La. (May '25)

**Grantham, George R.,** Capt., Sn.C., A.U.S., Box 1857, Portland, Mich. (Jan. '44) *P* ★

**Grassie, Charles Andrew,** Town Engr., Port Colborne, Ont., Can. (July '41)

**Grathwol, A. W.,** Supt., Water Dist., Sandusky, Ohio (July '44)

**Gravenhurst Elec. Light & Water Com.,** H. L. Martin, Chairman, Gravenhurst, Ont., Can. (Corp. M. Jan. '44)

**Graver Tank & Mfg. Co., Inc.,** G. V. Malmgren, Vice-Pres., 4809 Tod Ave., East Chicago, Ind. (Assoc. M. June '30)

**Graves, Quintin B.,** Asst. Prof. of Civ. Eng., College of Eng., Univ. of Texas, Austin 12, Tex. (Apr. '39) *P*

**Graves, Robin A.,** *see* Lynwood, City of

**Graves, Roy C.,** Supt. of Water Works, Anheuser-Busch, Inc., 721 Pestolozzi St., St. Louis 18, Mo. (July '35) *P*

**Gray Chemical Co., The,** E. W. Herr, Sales Mgr., Roulette, Pa. (Assoc. M. Apr. '40)

**Gray, E. W.,** Engr., c/o G. H. Jewell, 122 S. Michigan Ave., Chicago 3, Ill. (Apr. '44)

**Gray, Harold Farnsworth,** San. & Hydr. Engr., 2540 Benvenue Ave., Berkeley 4, Calif. (Aug. '33) *P*

**Gray, John S.,** Dept. of Public Works, Div. of Water, Rochester, N.Y. (July '40)

**Gray, Joseph P.,** Chemist, Castanea Paper Co., Box 42, Johnsonburg, Pa. (Jan. '41)

**Gray, Samuel,** Water Registrar, Montvale, N.J. (Oct. '35)

**Grayson, L. W.,** *see* Riverside Water Dept.

**Great Falls, City of,** Ed Henen, City Engr., Great Falls, Mont. (Corp. M. Jan. '25)

**Great Western Div.,** Dow Chemical Co., J. F. Smith, Sales Mgr., 310 Sansome St., San Francisco 4, Calif. (Assoc. M. July '41)

**Greco, A. J.,** Supt., Riverton & Palmyra Water Co., 1 Morgan Ave., Palmyra, N.J. (Affil. Jan. '39)

**Greece, Town of, Water Dept.,** William D. Denise, Supt., Box 85, Charlotte Station, Rochester 12, N.Y. (Corp. M. Oct. '35)

**Greeley, City of,** Roy E. Seaman, Water Supt., Greeley, Colo. (Corp. M. Apr. '26)

**Greeley, Samuel A.,** Greeley & Hansen, 6 N. Michigan Ave., Chicago 2, Ill. (July '07)

**Green, Alvin W.,** San. Engr., Dept. of Health, City Hall Annex, Tacoma 2, Wash. (Apr. '42) *P*

**Green, B. B.,** *see* Forest City Water Works

**Green Bay Water Dept.,** Harold L. Londo, Supt., Green Bay, Wis. (Corp. M. Nov. '14)

**Green, Carl E.,** Cons. Engr., John W. Cunningham & Assoc., 1112 Spalding Bldg., Portland 4, Ore. (July '31) *P*

**Green, Charles B.,** Supt., Florence Township Water Works, 410 W. Front St., Florence, N.J. (Apr. '39) *P*

**Green, E. W.,** Vice-Pres. & Treas., San Jose Water Works, Box 229, San Jose 2, Calif. (Oct. '25) *M*

**Green, Glenn,** R. D. 1, Conneaut, Ohio (July '43)

**Green, Harvey T.,** Sr. Admin. Officer, Bureau of Water Supply, 5318 Plymouth Rd., Baltimore 14, Md. (Jan. '40) *M*

**Green, Howard R.,** Cons. Engr., H. R. Green Co., Bever Bldg., Cedar Rapids, Iowa (Jan. '41) *P*

**Green, J. B., Plumbing & Equipment, Inc.,** George F. Higgins, Broadway & Green Sts., Sarasota, Fla. (Assoc. M. Apr. '44)

**Green, Nelson B.,** Secy., Detroit Chemical Works, 125 S. Junction Ave., Detroit 9, Mich. (Jan. '38)

**Green, Raleigh B.,** Supt., Water Works, 496 E. Tulare St., Dinuba, Calif. (Jan. '43) *M*

**Green, Richard S.,** Div. of Public Health Eng., Territorial Dept. of Health, Juneau, Alaska (Jan. '42)

**Green, Sterling S.,** Materials Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Jan. '39)

**Green, T. C.,** City Filtration Plant, Austin 4, Tex. (Apr. '25) ★

**Greenberg's, M., Sons,** Stuart N. Greenberg, 765 Folsom St., San Francisco 7, Calif. (Assoc. M. Sept. '24)

**Greenberg, Stuart N.,** *see* Greenberg's, M., Sons

**Greenblatt, Joseph,** *see* Publicker Commercial Alcohol Co.

**Greenfield, Harry C.,** 233 Maple Ave., Trenton, N.J. (Apr. '44) *MP* ★

**Greenfield, R. E.,** Tech. Supt., A. E. Staley Mfg. Co., Decatur 60, Ill. (Feb. '17) *P*

**Greenlee, J. L.,** Asst. Supt., Munic. Water Dept., Charlotte 2, N.C. (June '26) *M*

**Greenport Water Dept.,** Harry M. Monsell, Supt., Greenport, N.Y. (Corp. M. July '43)

**Greenport Water Dist. No. 1,** Paul R. Genzmer, Supt., Route 1, Hudson, N.Y. (Corp. M. July '43)

**Greensboro Water Dept.,** W. M. Lynbrook, Supt. of Public Service, Greensboro, N.C. (Corp. M. Oct. '43)

**Greenwood, Paul,** Chief Engr., Water Works, Moorestown, N.J. (Oct. '38)

**Greer, Willard N.,** Chem. Engr., Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia 44, Pa. (Apr. '26)

**Gregory, R. S.,** Supt., Munic. Water Dept., City Hall, Trinidad, Colo. (Jan. '40)

**Gregory, Robert W.,** Foreman of Filter Plant, Proximity Print Works, 1518 Upland Drive, Greensboro, N.C. (Apr. '39) *P*

**Gregory, T. H.,** 437 Bluff Rd., Montebello, Calif. (Oct. '42) *M*

**Greim, Carl C.,** *see* Ypsilanti Water Dept.

**Gresham, Paul J.,** Engr., El Campo, Tex. (Apr. '44)

**Gresham, R. O.,** Editor, *Southwest Water Works Journal*, Temple, Tex. (Apr. '43)

**Gresham, Robert L.,** Valuation Engr., Southern California Water Co., 1206 S. Maple Ave., Los Angeles 15, Calif. (Oct. '43) *M*

**Grewe, Leo F.,** Supt., Munic. Light & Water Co., Huntingburg, Ind. (Oct. '38)

**Griebel, Joseph,** *see* Liberty Water Works

**Grier, John L.,** Gen. Foreman, Cincinnati Gas & Elec. Co., 323 Plum St., Cincinnati 2, Ohio (Jan. '44)

**Griffeth, F. B.,** Dist. Engr., Wallace & Tiernan Co., Inc., 1325 W. Elsmere Pl., San Antonio, Tex. (Apr. '44)

**Griffey, H. A.,** Supt., Water Dept., City Hall, Janesville, Wis. (June '20)

**Griffin, Attmore E.,** San. Engr., Wallace & Tiernan Co., Inc., Pompton Plains, N.J. (May '30) *Fuller Award '44. P*

**Griffith, D. H.,** *see* Inglewood Water Dept.

**Griffith, E. Miles,** Distr. Engr., Racine Water Dept., City Hall, Racine, Wis. (July '42) *M*

**Griffith, Llewellyn B.,** Cons. & San. Engr., 904 Medical Arts Bldg., Waco, Tex. (Apr. '43)

**Griffiths, James G.,** Gen. Mgr., New Kensington Munic. Authority, New Kensington, Pa. (Oct. '24)

**Grime, Edwin M.,** Engr. of Water Service, Northern Pacific Ry., St. Paul 1, Minn. (July '26) *P*

**Grimmer, Allan K.,** Town Engr., Canadian International Paper Co., Temiskaming, Que., Can. (June '20)

**Grimshaw, E. V.,** Engr. & Asst. Supt., Woodlawn Water Co., 276 Sheffield Ave., Aliquippa, Pa. (Oct. '43) *M*

**Grinnell Co., Inc.,** S. O. Thorne, Branch Mgr., Box 2727, Charlotte 1, N.C. (Assoc. M. May '23)

**Grippen, Earl J.,** *see* Endicott Water Works Co.

**Griswold, Harold W.,** Deputy Mgr. & Deputy Chief Engr., Water Bureau of Metropolitan Dist., 1026 Main St., Hartford 3, Conn. (Mar. '33) *AM*

**Griswold, Lawrence J.,** Engr., Board of Water Supply, 712 Washington St., Utica, N.Y. (Mar. '33)

**Grodin, Bernard,** 43-24—43rd St., Long Island City 4, N.Y. (Apr. '39) ★

**Groner, E. C.,** Installation Engr., Sloan Valve Co., 4300 W. Lake St., Chicago 24, Ill. (Oct. '23)

**Gross, Dwight D.,** Chief Engr., Board of Water Comrs., Box 629, Denver 1, Colo. (July '25) *Fuller Award '44. M*

**Gross, E. E.,** *see* Clewiston, City of

**Gross, Roland A.,** Fridley Water Softening Plant, 43rd & Marshall St., N., Minneapolis 13, Minn. (Jan. '44)

**Grossman, Max,** Asst. Supt. & Engr., 3809 Ventor Ave., Atlantic City, N.J. (Oct. '40) *AM*

**Grotz, William H.,** Asst. Engr.—Constr., Div. of Water, Porter Ave. Pumping Station, Buffalo, N.Y. (June '21)

**Grove, Herbert S.,** Engr. & Supt., Board of Water Comrs., 20 N. 3rd St., Stillwater, Minn. (Oct. '37) *M*

**Grubb, Elmer K.,** Mgr., Pottstown Gas & Water Co., R.D. 3, Pottstown, Pa. (Jan. '37) *M*

**Gruetzmacher, Clarence S.,** Engr. of Distr., Milwaukee Water Works, 401 City Hall, Milwaukee 2, Wis. (June '20) *AMP*

**Grush, Delbert I.,** Asst. Supt. of Power, Anaconda Copper Mining Co., Anaconda, Mont. (Apr. '41)

**Guatemala City, Cia del Agua del Mariscal, S.A.,** Otto Roberto Dorion, Commercial & Technical Mgr., Guatemala City, Guatemala (Corp. M. Jan. '36)

**Guelph, City of,** H. S. Nicklin, City Engr., City Hall, Guelph, Ont., Can. (Corp. M. Mar. '24)

**Guenther, C. E.,** *see* Salem Water Com.

**Guerrero, Luis Lobo,** San. & Civ. Engr., Apdo. No. 409, Bogota, Columbia (Jan. '35)

**Gulden, Horace B.,** Mgr., State College Water Works, Alpha Fire Hall, State College, Pa. (Jan. '40)★

**Gulf States Utilities Co.,** Thos. E. Crossan, Supt. of Production, Box 2431, Louisiana Station, Baton Rouge 2, La. (Corp. M. Apr. '10)

**Gullo, S. J.,** Painesville Coca Cola Bottling Co., Ashtabula, Ohio (Jan. '42) ★

**Gumaer, Ralph,** Vice-Pres., Philadelphia Meter Co., 1212 Real Estate Trust Bldg., Philadelphia 7, Pa. (July '44)

**Gunderson, N. E.,** Pres., Layne-Northern Co., Mishawaka, Ind. (July '37)

**Gunter, Herman,** State Geologist, Box 495, Tallahassee, Fla. (May '28)

**Gurley, W. & L. E.,** H. M. Dibert, 514 Fulton St., Troy, N.Y. (Assoc. M. Apr. '19)

**Guthrie, John T.,** Mgr.-Pres., Signal Mt. Estates, Inc., Signal Mt., Tenn. (Apr. '37) *M*

**Gutierrez, Andrew,** San. Engr., c/o Post Engr., Camp Mackall, N.C. (Oct. '41)

**Gutsch, A. C.,** Supt., City Water Works, R. R. No. 4, Washington, Ind. (Jan. '39) *MP*

**Gutteridge, Wesley W.,** Supt., Spring Valley Water Works & Supply Co., 147 N. Main St., Spring Valley, N.Y. (Jan. '33) *M*

**Guttinz, L. A.,** Dist. Mgr., Public Service Co. of Indiana, Shelbyville, Ind. (Jan. '38)

**Guttridge, T. F.,** Mgr., Port Stanley Water Works Dept., Port Stanley, Ont., Can. (Apr. '41)

**Guyton, William F.,** Assoc. Hydr. Engr., U.S. Geological Survey, 531 Federal Bldg., Louisville 2, Ky. (Apr. '42)

**Haas, Frank S.,** Secy., City Water Works, Council Bluffs, Iowa (July '35)

**Haas, S. G. Frank,** Technical Engr., Sewerage & Water Board, New Orleans 12, La. (Oct. '33) *P*

**Haberer, James H.,** Chief Biochemist, Board of Water Supply, 712 Washington St., Utica 2, N.Y. (Jan. '44) *P*

**Haberer, H. N.,** *see* Adirondack Water Works

**Hablik, Frank J.,** Prin. Draftsman, Bureau of Water Supply, 1316 Crofton Rd., Baltimore, Md. (Jan. '42)

**Haddonfield Borough Water Dept.,** J. Ross Logan, Clerk, Borough of Haddonfield, N.J. (Corp. M. Apr. '40)

**Hadley, Henry,** City Engr., City Hall, Verdun, Que., Can. (Apr. '41)

**Haemmerlein, V. E.,** *see* East Aurora, Village of

**Haering, D. W., & Co., Inc.,** V. W. Haering, Pres., 205 W. Wacker Drive, Chicago 6, Ill. (Assoc. M. Jan. '44)

**Haering, V. W.,** *see* Haering, D. W., & Co., Inc.

**Hagar, C. C.,** *see* Palisades Del Rey Water Co.

**Hagar, Major C.,** 218 E. Water St., Boonville, Mo. (Apr. '39)

**Hagerstown Water Dept.,** C. M. Rinehard, Supt., City Bldg., Hagerstown, Ind. (Corp. M. Jan. '43)

**Hagginbothom, Wm. K.,** Water Supt., 422 Main St., Catskill, N.Y. (Apr. '41)

**Haggott, Ben,** Pres. & Mgr., Palos Verdes Water Co., Palos Verdes Estates, Calif. (Jan. '41)

**Hahn, Otto R.,** *see* Santa Ana Water Dept.

**Hail, J. J.,** Supt., Water Dept., City Hall, Dubuque, Iowa (Oct. '38) *AMP*

**Haimes, James,** City Engr., 7th St., S., Lethbridge, Alta., Can. (July '43)

**Hainstock, H. N.,** Dist. Mgr., International Water Supply, Ltd., 1722 College Ave., Regina, Sask., Can. (Apr. '41)

**Haiss, Carl E. J.,** San. Engr., Water Power & Control Com., 790 State Office Bldg., 80 Centre St., New York, N.Y. (Oct. '37) ★

**Hale, Frank C.,** C.W.O. Hq. 1st Troop Carrier Command, Stout Field, Indianapolis 6, Ind. (July '43) *P* ★

**Hale, Frank E.,** Director of Labs., Mt. Prospect Lab., 355 Park Pl., Brooklyn 17, N.Y. (May '08) *Goodell Prize '35. Honorary M. '44. P*

**Hale, Harrison,** Head of Chem. Dept., Univ. of Arkansas, Fayetteville, Ark. (Jan. '40) *P*

**Haley, F. C., III,** Supt., Board of Public Works, Louisiana, Mo. (Apr. '44) *MP*

**Hall, G. D.,** Cons. Engr., Larson Bldg., Yakima, Wash. (Jan. '36) *M*

**Hall, George L.,** 2411 N. Charles St., Baltimore 18, Md. (Oct. '37)

**Hall, H. F.,** Chief Engr., Water Works Dept., Northern Apts., Sarnia, Ont., Can. (June '20)

**Hall, H. G.,** Supt., Public Utilities Com., Ingersol, Ont., Can. (Mar. '23)

**Hall, Harry R.,** Chief Engr., Washington Suburban Sanitary Dist., Hyattsville, Md. (May '15) *MP*

**Hall, John D.,** Supt., Dept. of Water, Drawer 149, Waverly, N.Y. (Oct. '37) *M*

**Hall, John W.,** Mgr., Western Pipe & Steel Co., 2421 California Ave., Box 1066, Fresno, Calif. (July '41)

**Hall, John W.,** Fort Shaw, Mont. (May '25)

**Hall, L. Standish,** Hydr. Engr., East Bay Munic. Utility Dist., 512—16th St., Oakland 4, Calif. (July '33) *M*

**Hall, Ralph E.,** Town Chemist, Mooresville, N.C. (Oct. '41)

**Hall, Rodney D.,** Mgr., Water Works Div., Worthington Pump & Machinery Corp., Harrison, N.J. (Oct. '34)

**Hall, Roland B.,** Burford, Hall, Smith, Contractors, 705 Myrtle St., N.E., Atlanta, Ga. (Sept. '25)

**Hall, Ronald S.,** Pres., Hall & Co., Inc., 353 Delaware Ave., Delmar, N.Y. (Apr. '43)

**Hall, W. H.,** Dean of Eng., Duke Univ., College Station, Durham, N.C. (Jan. '30)

**Hall, W. L.,** *see* Staunton, City of

**Hallam, G. C.,** Water Supt., Box 447, Orofino, Idaho (June '33) *M*

**Hallam, James P.,** Engr. & Mgr., Manchester Corp. Water Works, Town Hall, Manchester, England (July '39)

**Hallgren, E. N.,** Mgr., Seattle Branch, Rensselaer Valve Co., 2726—1st Ave., S., Seattle 4, Wash. (Dec. '29)

**Hallgren, R. A.,** Supt., Water Works, Crystal Beach, Ont., Can. (Apr. '34)

**Halloran, Harry R.,** Contractor, The Conduit & Foundation Corp., 770 Schuylkill Ave., Philadelphia 46, Pa. (Apr. '44)

**Halpin, Henry E.,** Fire Protection Engr., Inspection Dept., Factory Mutual Fire Insurance Cos., 184 High St., Boston 10, Mass. (Jan. '30)

**Ham, John,** Water Mgr., Brisbane Water Co., Brisbane, Calif. (Oct. '38) ★

**Hamilton, Bruce,** Mgr., Hamilton Heath Water Co., 25 Hamilton Heath, Tampa, Fla. (Jan. '36) ★

**Hamilton, J. H.,** Supt.-Engr., Talladega Light & Water Com., Talladega, Ala. (Jan. '43)

**Hamilton, S. C.,** Dist. Sales Mgr., Chicago Bridge & Iron Co., Box 2567, Houston 1, Tex. (Jan. '36) *M*

**Hamler, Bruce,** Supt. of Water Works, City Hall, Rome, Ga. (Apr. '40) *MP*

**Hamlin, Francis M.,** Route No. 3, Mission, Tex. (Apr. '43) *MP*

**Hamlin, G. W.,** Acting Comr. of Water & Heat, Cleveland Water Dept., 104 City Hall, Cleveland 14, Ohio (July '40) *MP*

**Hammel, C. W.,** Water Plant Operator, Sistersville Water Works, 213 Railroad Ave., Sistersville, W.Va. (Affil. Jan. '39)

**Hammermill Paper Co.,** Christian Steinford, Laboratories, Erie, Pa. (Corp. M. Oct. '43)

**Hammerschmidt, E. G.,** Chief Chemist, Texoma Natural Gas Co., Fritch, Tex. (Jan. '39) *P*

**Hammes, J. Allan,** *see* Sheboygan Board of Water Comrs.

**Hamtramck Water Dept.,** Alexander Smolenski, Water Service Supervisor, 2963 Don Ave., Hamtramck 12, Mich. (Corp. M. Apr. '44)

**Handorf, Everett C.,** 733 S. 44th St., Louisville, Ky. (July '35) ★

**Hanes, J. C.,** Div. of Health & Sanitation, Institute of Inter-American Affairs, Mexico City, Mex. (July '39) *P* †

**Haney, Cecil G.,** Water Supervisor, Hercules Powder Co., Radford, Va. (Oct. '43) *M*

**Haney, Paul D.,** 2 Marvin Hall, Univ. of Kansas, Lawrence, Kan. (Jan. '39) *P*

**Hanks, Fred W.,** *see* Hanks, Fred W., Co.

**Hanks, Fred W., Co.,** Fred W. Hanks, Mgr., 10624 St. Clair Ave., Cleveland 8, Ohio (Assoc. M. June '26)

**Hanks, O. P.,** Sales Repr., Hersey Mfg. Co., Box 113, Trenton, N.J. (Oct. '35)

**Hanlon, T. W., Jr.,** 3624 Hanover, Dallas 5, Tex. (Oct. '39) ★

**Hanna, David McLean,** Supt. of Distr., 1121 Pelissier St., Windsor, Ont., Can. (June '20) *M*

**Hanna, R. B.,** Supt., Public Utilities Com., Listowel, Ont., Can. (Jan. '31)

**Hanning, T. L.,** Pres., Steel Tank & Pipe Co. of Oregon, Box 1898 Station F, Portland, Ore. (Oct. '39)

**Hannum, V. W.,** Supt., Water Dept., 518 S. Los Angeles St., Anaheim, Calif. (July '35)

**Hanover Public Utilities Com.,** Herman Denef, Supt. & Secy.-Treas., Box 476, Hanover, Ont., Can. (Corp. M. Jan. '44)

**Hansen, A. H.,** *see* Hibbing Water, Light, Power & Building Com.

**Hanson, Adellon F.,** 1737 Cambridge Ave., Cambridge, Mass. (Jr. M. Jan. '41) ★

**Hanson, Arthur M.,** 222 Winneconne Ave., Neenah, Wis. (Oct. '43) *P* ★

**Hanson, Harold A.,** Box 99, Grand Rapids, Minn. (July '35)

**Hanson, L. W.,** *see* California Corrugated Culvert Co.

**Hanzood, Joseph C.,** Supt., Warren Water Dept., 411 Mahoning, N.W., Warren, Ohio (Oct. '35)

**Harbert, Virgil R.,** Supt., Water Co., Lumberport, W.Va. (Affil. Jan. '44) *P*

**Harden, E. L.,** Sales Repr., Rensselaer Valve Co., 2556 Marshall Way, Sacramento, Calif. (Oct. '42)

**Hardesty, J. Paul,** Asst. Supt., Board of Trustees of Public Affairs, 215 S. Marietta St., St. Clairsville, Ohio (Apr. '40)

**Hardin, Eugene A.,** Engr. of Design, Bureau of Water, 242 Chestnut Street Pier, Philadelphia 6, Pa. (Nov. '25) *P*

**Harding, Fred W.,** Plant Supt., Okemah Water Works, R. No. 4, Okemah, Okla. (Apr. '36) *MP*

**Harding, James C.,** Comr. of Public Works, County Office Bldg., White Plains, N.Y. (June '22)

**Harding, Robert W.,** Pres., Bexar County Water Co., South San Antonio, Tex. (Oct. '35)

**Harding, William T., Jr.,** Mfr.'s Repr., 215 Providence Rd., Charlotte 4, N.C. (July '43) *M*

**Hardman, Thomas T.,** Cons. Engr., Hippodrome Bldg., Terre Haute, Ind. (July '40)

**Hardware & Supply Co., The,** H. H. Kuhn, Pres., 475–535 S. High St., Akron 11, Ohio (Assoc. M. July '44)

**Hardy, Charles B.,** Supt., Bureau of Water, 19 City Hall, Worcester 6, Mass. (July '42)

**Hare, George W.,** Water Supt., Munic. Water Utility, 301 Main St., Lake Placid, N.Y. (Apr. '44)

**Hare, J. M.,** Mgr. & Supt., Public Utilities Com., Port Dalhousie, Ont., Can. (Apr. '42) *M*

**Hargett, A. E.,** Ford Meter Box Co., Box 624, Bowling Green, Ky. (Mar. '29)

**Haring, F. D.,** *see* Ramsey Water Works

**Harkness, Bruce,** *see* Tate Pipe Linings, Inc.

**Harlamert, Paul A.,** Mgr., Transite Pipe Section, 1530 Builders Exchange Bldg., Cleveland 15, Ohio (July '35)

**Harlan Munic. Water Works,** C. S. Layson, Supt., Harlan, Ky. (Corp. M. Apr. '38)

**Harley, Frank E.,** Civ. Engr., Fairlawn-Radburn Trust Company Bldg., Fairlawn, N.J. (Jan. '36) *P*

**Harlock, C. R.,** Supt. of Water Treatment, U. S. Dept. of Justice, Lock Box 250, Steilacoom, Wash. (July '38) *P*

**Harman, W. B.,** Asst. Gen. Mgr., Newport News Water Works Com., Newport News, Va. (July '34)

**Harmon, Burt,** Hydr. Engr., Water Dept., 400 Municipal Utilities Bldg., Long Beach 2, Calif. (Oct. '32) *P*

**Harmon, Judson A.,** San. Engr., State Dept. of Health, State Bldg., Los Angeles, Calif. (Sept. '31)

**Harness, A. C.,** Town Clerk & Water Supt., Brush, Colo. (Oct. '37)

**Harnish, C. P.,** Exec. Vice-Pres., Southern California Water Co., 950 Bendix Bldg., 1206 S. Maple Ave., Los Angeles 15, Calif. (Aug. '29)

**Harper, E. A.,** Technical Director, Brunswick Pulp & Paper Co., Brunswick, Ga. (Jan. '42)

**Harper, J. J.,** Town Engr., Neepawa, Man., Can. (July '43)

**Harper, L. E.,** Pres., Omega Machine Co., Inc., 9 Codding St., Providence 1, R.I. (July '37) *P*

**Harragin, H. C.,** *see* Bird-Archer Co., Ltd.

**Harriger, Howard B.,** Supt., Coraopolis Water Dept., 616 School St., Coraopolis, Pa. (Apr. '41)

**Harrington, George E.,** Assoc. Chemist, Dalecarlia Filtration Plant, 5900 MacArthur Blvd., N.W., Washington 16, D.C. (July '43) *P*

**Harrington, John B.,** Director, Div. of San. Eng., State Dept. of Health, Charleston 5, W.Va. (July '38) *Fuller Award '41, Director '40–'43.*

**Harrington, John H.,** Chemist, Montreal Filtration Works, 3355 Joseph St., Verdun, Que., Can. (Jan. '37) *P*

**Harrington, W. L.,** Supt., Mayfield Elec. & Water Systems, 215 E. Broadway, Mayfield, Ky. (July '42) *M*

**Harris, Alfred J.,** Supt. of Public Works, Township of Haddon, 232 Burrwood Ave., Collingswood P.O., Camden County, N.J. (Apr. '42) *M*

**Harris, H. H.,** Engr. & Water Supt., Palisades Del Rey Water Co., 427 Moscow St., Venice, Calif. (Oct. '38) ★

**Harris, Henry S.,** Supt., Gas & Water Depts., Union Light, Heat & Power Co., Covington, Ky. (Apr. '43) *M*

**Harris, Houston,** Filter Plant Operator, Stillwater Water Dept., 212 N. Main St., Stillwater, Okla. (Oct. '42) *MP*

**Harris, Howard A.,** Asst. Engr., California Water Service Co., Box 1150, San Jose, Calif. (Aug. '27)

**Harris, John P.,** Industrial Chemical Sales Div., 35 E. Wacker Drive, Chicago 1, Ill. (Oct. '33) *P*

**Harris, R. C.,** Comr. of Works, City Hall, Toronto, Ont., Can. (Jan. '41) *Honorary M. '41.*

**Harris, Robert R.,** Postville, Iowa (Jan. '36) ★ †

**Harris, Roy M.,** Chief, Div. of Public Health Eng., State Dept. of Health, 8008—33rd St., N.W., Seattle, Wash. (Jan. '35) ★

**Harris, Shirley W.,** Mgr., Chicago Office, McWane Cast Iron Pipe Co., 333 N. Michigan Ave., Chicago 1, Ill. (Feb. '27)

**Harris, Stanford,** *see* Lenoir Water Dept.

**Harris, W. L.,** Chemist, Filtration Plant, 485 Marywood Drive, N.E., Grand Rapids, Mich. (July '40) *P*

**Harrison, Harry C.,** Board of Trustees, City Water Works, 130 Park Ave., Council Bluffs, Iowa (Jan. '44)

**Harrison, James,** Water Works Chief Engr., Peterborough Utilities, R.R. No. 4, Peterborough, Ont., Can. (Jan. '41) *MP*

**Harrison, Louis B.,** Supt. of Filtration, Bay City Water Works Dept., Bay City, Mich. (Feb. '31) *Fuller Award '44. MP*

**Harrison, Ronald,** *see* Scarborough Public Utilities Com.

**Harritt, Chester,** Chief Engr. & Gen. Mgr., La Mesa Lemon Grove & Spring Valley Irrigation Dist., 4769 Spring St., La Mesa, Calif. (Oct. '37)

**Harshbarger, E. D.,** Pres. & Gen. Mgr., The Pitt Construction Co., 1235 Washington Blvd., Pittsburgh 6, Pa. (June '24) *P*

**Harstad, Howard T.,** San. Engr., Pierce County Health Dept., 505 Courthouse, Tacoma, Wash. (Jan. '42) ★

**Hartley, John R.,** Asst. Sales Mgr., Builders-Providence, Inc., 9 Codding St., Providence 1, R.I. (Apr. '43)

**Hartman, Bruno J.,** Pres., Jerry Donohue Engineering Co., 608 N. 8th St., Sheboygan, Wis. (Jan. '44) *MP*

**Hartman, Floyd M.,** Dist. Mgr., Public Service Co. of Indiana, Inc., 137 S. Wabash St., Wabash, Ind. (July '43)

**Hartman, W. C.,** Supt. of Filtration, Water Works, Box 57, Milledgeville, Ga. (July '44)

**Hartmann, F. W.,** 941 S. Harvard Ave., Villa Park, Ill. (July '25) ★

**Hartung, H. O.,** Chemist, St. Louis County Water Co., 6600 Delmar Blvd., University City, St. Louis 5, Mo. (July '38) *P*

**Hartzell, W. J.,** *see* Peoria Heights Water Works Dept.

**Harvey Cedars, Borough of,** Reynold Thomas, Director of Public Works, Harvey Cedars, N.J. (Corp. M. Oct. '43)

**Harvey, L. R.,** Johns-Manville Sales Corp., 448 W. 24th Ave., Spokane 9, Wash. (July '43)

**Harvill, Clyde R.,** 1659 Vassar St., Houston, Tex. (Apr. '41) ★

**Harwood, S. A.,** 8830 Beaudine Ave., Los Angeles 2, Calif. (Oct. '42)

**Hasbrouck, Philip B.,** Engr., Fontana Domestic Water Co., Box 294, Fontana, Calif. (May '30) *M*

**Haskew, George M.,** Engr. & Supt., Plainfield-Union Water Co., 26 E. Broad St., Westfield, N.J. (July '29) *MP*

**Haskins, Charles A.,** Cons. Engr., 517 Finance Bldg., Kansas City 6, Mo. (June '14)

**Hasselgren, R. E.,** Supt., Water Filtration Plant, Folsom Prison, Box 228, Represa, Calif. (Affil. Jan. '42) ★

**Hassler, John W.,** Director of Research, Industrial Chemical Sales Div., 4 Hillcrest, Tyrone, Pa. (Jan. '37) *P*

**Hastings Board of Public Works,** Andrews S. Reiff, Water & Light Dept., Hastings, Neb. (Corp. M. Jan. '36)

**Hastings, Warren W.,** Assoc. Chemist, Quality of Water Div., U.S. Geological Survey, Box 1682 University Station, Austin 12, Tex. (Jan. '43)

**Hatch, A. S.,** Gen. Supt., Water Div., Utilities Dept., City Hall, Houston 2, Tex. (Oct. '42) *MP*

**Hatch, Aram H.,** Box 793, Balboa, Canal Zone (Aug. '27)

**Hatch, R. L.,** Plant Chemist, Brunner, Mond Canada, Ltd., Amherstburg, Ont., Can. (Jan. '42)

**Hatcher, Melvin Pross,** Director, Water Dept., City Hall, Kansas City 6, Mo. (July '40) *AM*

**Hatfield, William Durrell,** Sewage Disposal Plant, Sanitary Dist. of Decatur, 294 Linden Ave., Decatur 45, Ill. (Jan. '17)

**Hauck, Charles F.,** Asst. Plant Engr., Atlas Powder Co., Ravenna Ordnance Center, Apco, Ohio (Apr. '42) *MP*

**Hauck, G. W.,** Mgr. of Eng. Sales, Crane Co., 836 S. Michigan Ave., Chicago 5, Ill. (Jan. '42)

**Hauer, Gerald E.,** Water Supervisor, General Chemical Defense Corp., West Virginia Ordnance Works, Point Pleasant, W.Va. (July '41) *P*

**Haughey, James P.,** Utils. Mgr., Municipal Offices, Watkins Glen, N.Y. (July '44) *A*

**Hauserman, William R.,** Field Engr., The Pitometer Co., 36 Blanch St., Mansfield, Ohio (July '43)

**Hausmann, A. R.,** Asst. Pacific Coast Mgr., U.S. Pipe & Foundry Co., 681 Market St., San Francisco 5, Calif. (Aug. '33)

**Havens, William L.,** Havens & Emerson, Leader Bldg., Cleveland 14, Ohio (June '26) *P*

**Havill, Harold T.,** Civ. Engr., White Plains State Rd., Box 133, Valhalla, N.Y. (June '02) *MP*

**Havre Water Dept.,** E. J. Pepin, City Engr., City Hall, Havre, Mont. (Corp. M. Jan. '42)

**Hawken, Frank S.,** Sr. Chem. Engr., 3954 Greer Ave., St. Louis 7, Mo. (Jan. '35)

**Hawkins, J. L.,** Supt., City Water Works, Greenville, S.C. (Jan. '36) *M*

**Hawkins, Karl W.,** Field Engr., The Pitometer Co., 1608 Fairview Ave., Park Ridge, Ill. (Apr. '44)

**Hawkins, W. J.,** *see* Bridgeport Brass Co.

**Hawksley, Thomas E.,** *see* Institution of Water Engineers

**Hawley, John J.,** Sales & Service, Hersey Mfg. Co., 2215 S. Calhoun St., Fort Wayne 5, Ind. (Apr. '43)

**Hawley, W. R.,** Mayor & Chairman of Board, Village Water Dept., Webster, N.Y. (Jan. '42) *A*

**Hawthorne Munic. Water Works,** Hawthorne, Calif. (Corp. M. Jan. '42)

**Hay, Harold R.,** Chemical Dept., Philadelphia Quartz Co., 121 S. Third St., Philadelphia 6, Pa. (Apr. '44) *P*

**Hayden, Richard W.,** Chemist, Suburban Water Co., 5 Costello Rd., Verona, Pa. (July '41) *P*

**Haydock, Charles,** Cons. Engr., Commercial Trust Bldg., Philadelphia 2, Pa. (Feb. '19)

**Hayes, H. W.,** Supt. of Water Works, Lawrenceville, Va. (July '34)

**Hayes, Harry,** Asst. San. Engr., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Feb. '33) *Goodell Prize '37. P*

**Haynes, Lawson,** Plant Supt., West Virginia Water Service Co., 2006 Crescent Rd., Charleston 2, W.Va. (Oct. '39) *P*

**Hays Mfg. Co.,** John D. Clemens, Vice-Pres., 12th & Liberty Sts., Erie, Pa. (Assoc. M. Mar. '82)

**Hays, W. J.,** Engr., 1314 Monterey Ave., Berkeley 6, Calif. (Oct. '39) ★

**Haytin, John J.,** *see* Helena Water Dept.

**Haywood, R. W., Jr.,** Outside Area Supervisor, Power Dept., U.S. Rubber Co., Kankakee Ordnance Works, Joliet, Ill. (Jan. '37) *MP*

**Hazen, John B.,** Supt., Butte Water Co., Butte, Mont. (Apr. '38)

**Hazen, Ray,** Supt., Willapa Valley Water Dist., Menlo, Wash. (Affil. Jan. '40)

**Hazen, Richard,** c/o Malcolm Pirnie, 25 W. 43rd St., New York 18, N.Y. (July '37) *MP* ★

**Hazey, George,** Supt. of Filtration, Marine City Filter Plant, Marine City, Mich. (July '41) *P*

**Healdsburg, City of,** Archer B. Stuart, Water Supt., City Hall, Healdsburg, Calif. (Corp. M. Oct. '37)

**Heath, A. E.,** Foreman, City Water Dept., Box 958, Billings, Mont. (Apr. '40)

**Heaton, Gerald L.,** Mechanic & Chief Operator, Water Softening Plant, 509 Virginia Ave., Troy, Ohio (Apr. '44) *M*

**Hebbler, O. L.,** Supt., Munic. Utilities, Higginsville, Mo. (Apr. '44) *M*

**Hebior, Charles,** Supt., Filtration & Pumping Station, North Chicago, Ill. (July '42) *MP*

**Hechmer, Carl A.,** Dept. Engr., Maint. & Operation Dept., Washington Suburban Sanitary Dist., Hyattsville, Md. (Nov. '19) *Fuller Award '40. MP*

**Heck, Robert L.,** Supt., Munic. Filter Plant, Pittsburg, Calif. (Oct. '37) *MP*

**Heddell, Douglas,** 929 Shevlin Drive, El Cerrito, Calif. (Oct. '33)

**Hedgepeth, L. L.,** 27 Twyckenham Rd., Bowling Green, Media, Pa. (Aug. '29) *Fuller Award '44. P*

**Hedman, O. F.,** Salesman, Hughes & Co., Box 193, Spokane, Wash. (June '34)

**Heffelfinger, Donald D.,** Supervising Chemist, Alliance City Water Works, 560 W. Oxford St., Alliance, Ohio (July '41)

**Heffelman, M. C.,** *see* New Mexico Power Co.

**Heider, Robert W.,** San. Engr., State Board of Health, 1098 W. Michigan St., Indianapolis 7, Ind. (July '37)

**Heim, Arthur I.,** *see* Copper & Brass Research Assn.

**Heine, Francis A.,** Chief Engr., Bureau of Water, City Hall, Reading, Pa. (June '31) *AMP*

**Heiner, Roy,** Water Supt., 612 N. 5th Ave., Sandpoint, Idaho (Affil. Jan. '41) *M*

**Heiss, Edward A.,** Pacific Northwest Div. Mgr., Wallace & Tiernan Sales Corp., 917 Terminal Sales Bldg., Seattle 1, Wash. (Oct. '42) *MP*

**Helbig, W. A.,** Chem. Engr., Darco Corp., Sales Div., 60 E. 42nd St., New York 17, N.Y. (Feb. '30) *P*

**Helena Water Dept.,** John J. Haytin, Mayor, Helena, Mont. (Corp. M. Jan. '37)

**Helland, H. R. F.,** Cons. Engr., Frost National Bank Bldg., San Antonio 5, Tex. (Jan. '35) *P*

**Heller, Austin,** 10 Monroe St., New York 2, N.Y. (Jan. '43) *MP* ★

**Hellstrom, Carl I.,** Supt., Water & Light Dept., Geneva, Ill. (Mar. '33)

**Helmreich, L. W.,** Pres. & Mgr., Capital City Water Co., Box 806, Jefferson City, Mo. (Feb. '27)

**Helms, Perry H.,** Supt., Water Dept., Box 534, Myrtle Beach, S.C. (Oct. '42)

**Helwick, Chas. H.,** Gen. Foreman of Distr., Water Dept., Utilities Bldg., Jacksonville 2, Fla. (Jan. '40) *M*

**Hemborg, Harold B.,** Water Works Engr., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Jan. '41)

**Hemborg, R. E.,** Distr. Engr., Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (Apr. '37) *M*

**Hemp Water Dept.,** C. B. Brooks, Supt., Hemp, N.C. (Corp. M. Oct. '42)

**Hempstead, Inc. Village of,** W. L. King, Chief Operator, Munic. Water Plant, 318 Fulton Ave., Hempstead, N.Y. (Corp. M. Jan. '40)

**Henderlite, James H.,** Filtration Plant, Douglasdale Rd., Richmond, Va. (Jan. '36) ★

**Henderson, Angus D.,** Civ. Engr., 210–07—29th Ave., Bayside, N.Y. (Jan. '37) *M*

**Henderson, Charles R.,** 1 University Pl., New York 3, N.Y. (June '01) *Vice-Pres. '08, '13. Exec. Com. '09–'12, '20–'21. Trustee '14–'16. President '19. Honorary M. '36.*

**Henderson Water Works,** Henry T. Powell, Mgr., 108 Young St., Henderson, N.C. (Corp. M. Jan. '42)

**Hendricks, R. W.,** Engr., Hydr. Dept., Underwriters Labs., 207 E. Ohio St., Chicago 11, Ill. (Apr. '23) *M*

**Hendrickson, Geo. L.,** Asst. Mng. Engr., Bureau of Water, City-County Bldg., Pittsburgh 19, Pa. (Mar. '31)

**Hendrickson, V. E.,** Gen. Mgr., Industrial Limestone Products Co., 732 Frick Bldg., Pittsburgh 19, Pa. (Apr. '43) *P*

**Hendrix, D. A.,** Local Mgr., California Water Service Co., Box 502, Chico, Calif. (Oct. '39) *M*

**Henen, Ed,** *see* Great Falls, City of

**Henke, Roland,** Supt., Water Works, 7300 Blanchard St., Wauwatosa 13, Wis. (Jan. '35) *M*

**Henley, M. E.,** Box 63, Station E, Atlanta, Ga. (July '39)

**Henning, Edwin C.,** Pres., Board of Trustees, Water Works Dept., City Bldg., Evansville 9, Ind. (Jan. '43)

**Henning, H. Clay,** Div. Engr., Operating Sec., St. Louis Water Div., 1640 S. Kingshighway, St. Louis 10, Mo. (Feb. '30) *M*

**Hennings, John P.,** Engr., Shenango Valley Water Co., Sharon, Pa. (Oct. '41) *M*

**Hennon, John R.,** Water Supt., Port Neches, Tex. (Apr. '44) *P*

**Henriques, José Franco,** Head of Bureau of Water Supply, Federal Service of Water & Sewage, Rua Gtavio Correa, 95—Urca, Rio de Janeiro, Brazil, S.A. (Jan. '44)

**Henry, Clarence R.,** Water Treatment Technician, Munic. Water Works, 2386 S.W. 5th St., Miami, Fla. (Apr. '40) ★

**Henry, J. D.,** Gen. Foreman, City Water Works, 701 Bourbon St., Dallas, Tex. (July '43)

**Henry, J. Rex,** Dept. of Utilities, 734 N. Park Ave., Fremont, Neb. (Aug. '32) *A*

**Henry, T. B.,** Cons. Engr., 2210 Eastbrook Drive, Toledo 12, Ohio (Jan. '39)

**Henry, W. Weir,** *see* Revere Copper & Brass, Inc.

**Hensel, Eugene,** Dist. San. Engr., State Board of Health, 318 W. Main St., Sparta, Wis. (July '44) *P*

**Henson, Frederick John,** Prin. Engr., Water Div., Office of War Utilities, 5128 Loughboro Rd., N.W., Washington 16, D.C. (Oct. '43)

**Henthorn, George W.,** Chief Inspector, Bureau of Water Supply, 3711 Yosemite Ave., Baltimore 15, Md. (Jan. '42) *MP*

**Henzell, Ezmah R. (Mrs.),** Office Mgr., Lakewood Water Dist., Route 8, Box 674, Tacoma, Wash. (Jan. '44) *A*

**Hepler, John M.,** Director, Bureau of Eng., Dept. of Health, Lansing 4, Mich. (Oct. '43) *MP*

**Herberg, Sanford,** *see* Fire Underwriters Inspection Bureau

**Hernandez, Alberto,** Director of Public Works, Govt. of the Capital, San Juan, P.R. (Oct. '42)

**Herndon, L. Kermit,** Asst. Prof., Chem. Eng., Ohio State Univ., 2303 Onandaga Drive, Columbus 8, Ohio (Jan. '44) *P*

**Herneisen, Irvin R.,** Supt., Dept. of Water, 126 Philadelphia Ave., Shillington, Pa. (July '44)

**Herniman, E. T.,** *see* Sterling Engine Co.

**Herpin, J. O.,** Supt. of Water & Light, Box 740, Abbeville, La. (Oct. '42) *AMP*

**Herr, E. W.,** *see* Gray Chemical Co.

**Herr, J. O.,** Mgr., Monmouth Consolidated Water Co., Long Branch, N.J. (June '16) *M*

**Herring, Clyde F.,** San. Engr. & Director, Jefferson County Board of Health, Box 2591, Birmingham 2, Ala. (Apr. '43) *P*

**Herring, D. J.,** Supt. of Water Dept., Box 120, Parlier, Calif. (July '41) *M*

**Herring, Jos. E.,** Chief Foreman, Water Dept., Utilities Bldg., Jacksonville, Fla. (Jan. '40)

**Herrmann, A. J.,** Branch Mgr., American Cast Iron Pipe Co., 2701 Fidelity Bldg., Kansas City 6, Mo. (July '44)

**Herrmann, Frank,** Office Engr. & Designer, Oklahoma City Water Dept., 1913 N. W. 21st St., Oklahoma City 6, Okla. (Apr. '42) *MP*

**Herron, William L.,** Box 234, Oswego, N.Y. (Oct. '37) *M*

**Hersey Mfg. Co.,** South Boston 27, Mass. (Assoc. M. July '87)

**Hersey, T. Schuyler,** Pres., Hersey Inspection Bureau, 3405 Piedmont Ave., Oakland 11, Calif. (Jan. '40)

**Hershey, H. G.,** *see* Iowa Geological Survey

**Hershman, Herb,** Mgr., Pacific Coast Div., The Asphalt Institute, 546 Russ Bldg., San Francisco 4, Calif. (Jan. '43)

**Hertel, J. F.,** Secy.-Treas., Public Utilities Com., 22 Queen St., N., Waterloo, Ont., Can. (Jan. '40)

**Hess, Irving C.,** Div. Engr., California Water & Telephone Co., 19 W. 9th St., National City, Calif. (Jan. '41)

**Hess, John S.,** Chief Engr. of Refineries, Sinclair Refining Co., 630 Fifth Ave., New York 20, N.Y. (Oct. '42)

**Hetherington, S.,** Chief Engr. & Supt., Filtration Plant, Beach Pumping Station, R.R. 5, Box 86, Hamilton, Ont., Can. (Jan. '43) *M*

**Hetzer, Hugh W.,** 8447 Midland St., Overland 14, Mo. (July '35) *M*

**Hetzer, Mentor,** Moundsville Water Co., 506 Seventh St., Moundsville, W.Va. (Nov. '16) *Director '39–'40. Fuller Award '43.*

**Heubi, Thomas B.,** Supt. of Water Works, 45 Washington Ave., Fredonia, N.Y. (Apr. '30)

**Heuser, Karl F.,** Supt. of Water, Matawan Boro, Church St., Matawan, N.J. (July '43) *M*

**Hewett, Arthur L.,** Supt., Water Dept., Box 958, Billings, Mont. (Mar. '32)

**Hewitt, D. S.,** Supt., Water & Light Plant, Knightstown, Ind. (Apr. '44)

**Heyward, T. C.,** Mech. & Elec. Engr., 1408 Independence Bldg., Charlotte 2, N.C. (June '23)

**Hiatt, C. W.,** Civ. Engr., Cleveland Water Dept., 624 Auditorium Garage Bldg., Cleveland 14, Ohio (Apr. '43) *AMP*

**Hibbing Water, Light, Power & Building Com.,** A. H. Hansen, Supt. & Chief Engr., Hibbing, Minn. (Corp. M. July '34)

**Hibbs, A. S.,** 36 W. 2nd St., Chillicothe, Ohio (Sept. '22)

**Hickcox, R. M.,** Water Supt., Water Shop, Wenatchee, Wash. (Apr. '38)

**Hickey, Fred,** Supt., Water Works, 1316 Madison Ave., Piqua, Ohio (July '44) *P*

**Hickey, John A.,** 9818 Heath Ave., S.E., Cleveland 4, Ohio (Apr. '40) *M*

**Hicklin, Robert G.,** Mgr., Munic. Dept., Robert & Co., Inc., 706 Bona-Allen Bldg., Atlanta 3, Ga. (Apr. '29) *P*

**Hickman, Kenneth,** Street & Water Supt., Colfax, Wash. (Apr. '44)

**Hickok, Sidney J.,** Supt., Katonah Water Dist. & Cherry St. Water Dist., 7 Ridge St., Katonah, N.Y. (Oct. '43) *M*

**Hickory, City of,** R. E. Smyre, Hickory, N.C. (Corp. M. Nov. '33)

**Hicks, J. M.,** Supt., La Canada Irrigation Dist., Box 37, La Canada, Calif. (Jan. '44)

**Hicks, W. F.,** City Engr. & Supt. of Water Works, Paris, Tex. (Jan. '35) *M*

**Hicksville Water Dist.,** Frederick R. Davidson, Dist. Supt., 85 Bethpage Rd., Hicksville, N.Y. (Corp. M. Oct. '34)

**Higburg, William,** *see* Reilly Tar & Chemical Corp.

**Higgins, George F.,** *see* Green, J. B., Plumbing and Equipment, Inc.

**Higgins, Roger C.,** Chemist, Board of Public Works, City Hall, Hannibal, Mo. (Jan. '37) *P*

**Highland, Scotland G.,** Secy., Treas., Gen. Mgr. & Sr. Engr., Clarksburg Water Board, Clarksburg, W.Va. (Feb. '13) *MP*

**Hileman, H. L.,** Mgr., Cairo Water Co., 618 Commercial Ave., Cairo, Ill. (Jan. '40) *M*

**Hiler, Floyd,** *see* Rockaway Borough Water Dept.

**Hill, Alfred H.,** Vice-Pres., Francis Hankin & Co., Ltd., 2028 Union Ave., Montreal, Que., Can. (Feb. '33)

**Hill, D. A.,** *see* Waterford Public Utilities Com.

**Hilker, Earl E.,** *see* Smith, S. Morgan, Co.

**Hill, Frank C.,** Water Supt., Box 155, Montrose, Colo. (Jan. '37)

**Hill, Harold H.,** Engr., State Dept. of Health, 278 Northridge Rd., Columbus 2, Ohio (Apr. '44) *P*

**Hill, Hubbell & Co. Div.,** General Paint Corp., Milton M. Bowen, Vice-Pres., 3091 Mayfield Rd., Cleveland 18, Ohio (Assoc. M. Jan. '38)

**Hill, J. H.,** Supt., Argos Munic. Water Works, 119 W. Walnut St., Argos, Ind. (Jan. '43)

**Hill, H. O.,** *see* Bethlehem Steel Co.

**Hill, Kenneth V.,** Greeley & Hansen, 6 N. Michigan Ave., Chicago 2, Ill. (Jan. '37) *P*

**Hill, O. E.,** Water Supt., Washington Water Power Co., Coeur d'Alene, Idaho (Apr. '44) *MP*

**Hill, R. F., Jr.,** Asst. Engr., State Board of Health, Raleigh, N.C. (Jan. '37) ★

**Hill, Raymond A.,** Cons. Civ. Engr., 1000 Edison Bldg., 601 W. Fifth St., Los Angeles 13, Calif. (Feb. '32)

**Hill, W. R.,** Cons. Civ. Engr., Parker & Hill, 2021 Smith Tower, Seattle 4, Wash. (Apr. '39)

**Hillsboro Utilities Com.,** Richard E. Wiley, Supt., City Hall, Hillsboro, Ore. (Corp. M. Jan. '42)

**Hillsboro Water Dept.,** M. P. Lloyd, Supt., Box 386, Hillsboro, N.C. (Corp. M. Oct. '42)

**Hillsborough Water Dept.,** E. P. Wilsey, City Mgr., 705 El Camino Real, Burlingame, Calif. (Corp. M. Apr. '39)

**Hiltz, John E.,** *see* Wayne County Board of County Road Comrs.

**Hinds, Julian,** Gen. Mgr. & Chief Engr., Metropolitan Water Dist., 306 W. Third St., Los Angeles 13, Calif. (May '31)

**Hines, Paul L.,** Service Engr. & Sales Repr., Mueller Co., Decatur, Ill. (Jan. '43)

**Hinkle, Stacy C.,** Asst. Mgr., Mine & Smelter Supply Co., Denver, Colo. (July '40)

**Hinman, Jack J., Jr.,** Assoc. Prof. of Sanitation, Univ. of Iowa, Box 363, Iowa City, Iowa (Apr. '15) *Trustee '19–'21. Vice-Pres. '29. President '30. Director '31.* ★

**Hinshaw, R. V.,** Sr. Water Operator, Post Engrs., Camp Atterbury, 304 S. Kyle, Edinburg, Ind. (Apr. '43) *MP*

**Hinton, L. E.,** Service & Sales Repr., 1120 Scott St., Little Rock, Ark. (Apr. '43)

**Hintz, Albert E., Jr.,** Mgr., Water Dept., 8 City Hall, Oshkosh, Wis. (Apr. '30)

**Hinyard, J. N.,** Chem. Engr., Water & Sewerage Dept., El Paso, Tex. (Oct. '38) ★

**Hirn, W. C.,** San. Engr., 532 Michigan Bldg., Detroit 26, Mich. (Jan. '38) *MP*

**Hirsch, A. Adler,** Instructor in Water Purif., State Dept. of Education, Div. of Trade & Industrial Education, 2009 Robert St., New Orleans 15, La. (Apr. '41) *P*

**Hiskey, D. R.,** Chem. Engr., Dearborn Chemical Co., 310 S. Michigan Ave., Chicago 4, Ill. (Apr. '42) *P*

**Hitchings, Allen,** Civ. Engr., 703 Arctic Bldg., Seattle 4, Wash. (Apr. '44)

**Hitzeroth, Harry,** *see* Tavistock Public Utilities Com.

**Hoad, William Christian,** 2108 Melrose Ave., Ann Arbor, Mich. (June '13)

**Hoag, E. D.,** 3058 N. Olive Ave., Altadena, Calif. (Oct. '34) *M* ★

**Hoag, Geo. F.,** Engr., Suburban Div., New York Fire Insurance Rating Organization, 85 John St., New York 7, N.Y. (June '20) *M*

**Hoak, Richard D.,** Sr. Fellow, Mellon Institute, Pittsburgh 13, Pa. (Jan. '37) *P*

**Hobart, Yale,** Engr., Water Supply Section, U.S. Engrs. Office, Box 4970, Jacksonville, Fla. (Apr. '44) *P*

**Hochlerner, Tobias,** Chief Engr., Dept. of Water Supply, Gas & Electricity, 2456 Municipal Bldg., New York 7, N.Y. (May '30)

**Hodge, W. W.,** Head, Dept. of Chem. Eng., West Virginia Univ., Morgantown, W.Va. (Jan. '39) *P*

**Hodges, J. E.,** San. Engr., 11th Naval Dist., 1344 National Ave., San Diego 2, Calif. (Oct. '43) *P*

**Hodges, S. M.,** Chemist, Div. of Water, Lake Prince Filtration Plant, 37th St. & Parker Ave., Norfolk, Va. (Oct. '43) *MP*

**Hodgin, R. K.,** Engr., Layne-New York Co., Inc., 1200 W. Elizabeth Ave., Linden, N.J. (July '44) *P*

**Hodgson, J. L.,** Southern Repr., A. P. Smith Mfg. Co., 1221 Mortgage Guarantee Bldg., Atlanta 3, Ga. (Apr. '44)

**Hodgson, Jno. W.,** Pres. & Gen. Mgr., East Jefferson Water Works No. 1, Metairie 20, La. (Oct. '42)

**Hodkinson, Thomas,** Supt. of Water Works, 382 Wortley Rd., London, Ont., Can. (Apr. '13) *M*

**Hoefle, K. F.,** Distr. Engr., Municipal Bldg., Dallas 1, Tex. (Apr. '40) *M*

**Hoeltzner, Nicholas J.,** *see* Rock Island Water Dept.

**Hoey, Alexander C.,** Engr. & Supt., Township of Nepean Water & Sewers Dept., 345 Richmond Rd., Ottawa, Ont., Can. (Apr. '44)

**Hoffer, H. A.,** Asst. Gen. Sales Mgr., U.S. Pipe & Foundry Co., Gen. Office, Burlington, N.J. (May '30)

**Hoffman, Frank A.,** Dist. Supt., Maplewood, Ore. (July '34)

**Hoffman, L. J.,** Office Mgr., City Water Works, 100 Municipal Bldg., Akron 8, Ohio (Apr. '39) *A*

**Hoffman, M. F.,** Commercial Supt., Dept. of Water Works, 142 City Hall, Cincinnati 2, Ohio (Oct. '34) *Fuller Award '41. A*

**Hofmann, George H.,** Repr., Mueller Co., 2417 Nottingham, Houston, Tex. (July '43)

**Hogan, John Phillip,** Partner, Parsons, Brinckerhoff, Hogan & Macdonald, 142 Maiden Lane, New York 7, N.Y. (June '20)

**Hoggan, Ivin,** *see* Burley, City of

**Holaday, K. M.,** Chem. Engr., Anheuser-Busch, Inc., 721 Pestallozzi St., St. Louis 18, Mo. (Jan. '40) *P* ★

**Holcomb, Edwin,** Chemist, Water & Sewerage Treatment, 2101 Nueces St., Austin, Tex. (Oct. '43)

**Holden, Joseph W.,** Chief Engr., Board of Water Comrs., New Britain, Conn. (July '37)

**Holditch, Jno. P.,** *see* Palm Springs Water Co.

**Holdrege, Charles F.,** Eng. Dept., Metropolitan Utilities Dist., 18th & Harney Sts., Omaha, Neb. (Oct. '34) ★

**Holguin, Francisco C.,** *see* Chihuahua, Junta Central de Aguas del Estado de

**Holladay, John M.,** Chairman of Water Com., Water Dept., Camden, Tenn. (Jan. '41)

**Holliday, V. G.,** *see* Cliffs Dow Chemical Co.

**Holloway, E. L.,** *see* Flint Water Dept.

**Holland, Paul L.,** Chief Engr., Public Service Com. of Maryland, 1701 Munsey Bldg., Baltimore 2, Md. (Mar. '32) *M*

**Holland Water Dist. No. 1,** Clair D. Tanner, Supt. of Water, Holland, N.Y. (Corp. M. Apr. '37)

**Hollander, Harry,** Div. Engr., Dept. of Water Supply, Gas & Electricity, 2401 Municipal Bldg., New York 7, N.Y. (May '30) *M*

**Hollinsworth, Morris F.,** Mgr., Light & Water Dept., Lafayette, Ala. (Apr. '43)

**Hollister Water Co.,** A. W. Holsworth, Supt., 314 West, Hollister, Calif. (Corp. M. Nov. '33)

**Holman, Albert L.,** Chemist, Water Works, Covington, Ky. (Oct. '42)

**Holman, E. T.,** Supt., Eng. Dept., Tennessee Inspection Bureau, 1034 Stahlman Bldg., Nashville 3, Tenn. (Jan. '24)

**Holmes, Joseph A.,** Asst. Vice-Pres., National Aluminate Corp., 6216 W. 66th Pl., Chicago 38, Ill. (May '26)

**Holmquist, C. A.,** Director, Div. of Sanitation, State Dept. of Health, State Office Bldg., Albany 1, N.Y. (Apr. '23) *P*

**Holroyd, N. S.,** Keis & Holroyd, 257 Broadway, Troy, N.Y. (July '41)

**Holsworth, A. W.,** *see* Hollister Water Co.

**Holton, Philip J., Jr.,** *see* Providence Water Supply Board

**Holway, W. R.,** Cons. Hydr. Engr., 302 E. 18th St., Tulsa 5, Okla. (Feb. '25) *P*

**Holy, William E.,** Mgr., West Virginia Water Service Co., Oak Hill, W.Va. (Affil. July '34)

**Home Water Co., The,** W. Wilson Kulp, Secy.-Treas., 326 Main St., Royersford, Pa. (Corp. M. Jan. '44)

**Home Water Dist.,** (Miss) E. Jensen, Asst. Secy., 7840 S.W. Capitol Highway, Portland 1, Ore. (Corp. M. Apr. '39)

**Homelite Corp.,** Nelson Thompson, Riverdale Ave., Port Chester, N.Y. (Assoc. M. Apr. '36)

**Hommon, Harry B.,** 6407 Regent St., Oakland, Calif. (July '21)

**Honolulu Board of Water Supply,** Frederick Ohrt, Mgr., City & County of Honolulu, Box 3347, Honolulu, T. H. (Corp. M. Nov. '30)

**Hood, E. J.,** Supt., Filter Plant, Central Power & Light Co., Box 507, Laredo, Tex. (Jan. '44) *MP*

**Hooker, Albert H., Jr.,** Hooker Electrochemical Co., Tacoma, Wash. (July '30) ★

**Hooker Electrochemical Co.,** John S. Coey, Niagara Falls, N.Y. (Assoc. M. July '20)

**Hooker, L. J.,** Supt. of Water Works, City Bldg., Pine St., Lockport, N.Y. (Mar. '31)

**Hoop, Lance H.,** Gen. Mgr., Western Filter Co., Stockyards Station, Denver 16, Colo. (Jan. '44) *P*

**Hoover, Charles P.,** Chemist, Filtration Plant, Columbus 8, Ohio (May '13) *Fuller Award '43.*

**Hoover, Clarence B.,** Gen. Supt., Div. of Water, City Hall, Columbus, Ohio (Apr. '23)

**Hoover, Ira M.,** Supt., Montpelier Water Works, Montpelier, Ohio (Apr. '39) *M*

**Hopkin, W. Howard,** 1218 S. 3rd, Louisville 2, Ky. (Jan. '40) ★

**Hopkins, David W.,** *see* R-S Products Corp.

**Hopkins, E. W.,** 216 W. Wilson St., Salina, Kan. (Jan. '37) *M*

**Hopkins, Edward S.,** 4402 Roland Ave., Baltimore 10, Md. (June '21) *P* ★

**Hopkins, Edwin W.,** 712 Washington St., Utica 2, N.Y. (Aug. '25)

**Hopkins, Glen J.,** Acting Director, Div. of Eng., State Board of Health, Pierre, S.D. (July '43) *MP*

**Hopkins, O. C.,** San. Engr., U.S. Public Health Service, 603 B.M.A. Bldg., Kansas City 8, Mo. (Jan. '37)

**Hopper, Allen O.,** Turbine Equipment Co., 75 West St., New York 6, N.Y. (Apr. '37)

**Hopper, Everett S.,** Bottlers' Service Dept., The Coca-Cola Co., 310 North Ave., N.W., Drawer 1734, Atlanta 1, Ga. (Jan. '42)

**Hopper, Samuel H.,** W.S.A., 99 John St., New York 7, N.Y. (Oct. '43) *MP* †

**Horan, John J.,** Supt., Delaware River Water Co., Beverly, N.J. (Jan. '30)

**Horandt, Henry,** Mgr., New York Water Service Corp., 2015 Church Ave., Brooklyn 26, N.Y. (June '29) *M*

**Hord, C. E.,** Mgr., Northern Illinois Water Corp., 120 N. Park St., Streator, Ill. (Jan. '43) *MP*

**Horlacher, George A.,** Engr., Calgon, Inc., 1740 E. 12th St., Cleveland 14, Ohio (Jan. '43)

**Horne, Ralph W.,** Cons. Engr., Fay, Spofford & Thorndike, Cons. Engrs., 11 Beacon St., Boston 8, Mass. (May '28) *AM*

**Horner, Charles M.,** Supt., Water Works Co., 1705 State St., East St. Louis, Ill. (June '03)

**Horner, Edwin O.,** Div. Mgr., Northeastern Water & Elec. Corp., Walnut St. Bridge, Lemoyne, Pa. (May '30) *M*

**Horner, J. L.,** Supt., Water Dept., Henderson, Tex. (Oct. '39) *M*

**Horner, R. H.,** *see* Dixon, Joseph, Crucible Co.

**Horning, Fred,** Mgr., Elec. Light & Water Works, Superior, Mont. (Apr. '26)

**Hornshaw, James E.,** Asst. Civ. Engr., Dept. of Water Supply, 13376 Hubbell Ave., Detroit 27, Mich. (July '38)

**Horsington, Earl,** Supt. of Water, Skaneateles, N.Y. (July '35)

**Horstman, Herman G.,** Asst. to Vice-Pres., Public Service Co. of Indiana, Traction Terminal Bldg., Indianapolis 9, Ind. (Jan. '37)

**Horstmann, F. B.,** Chem. Engr., 1005 N. Leamington Ave., Chicago 51, Ill. (June '27) *P*

**Horton, George T.,** *see* Chicago Bridge & Iron Co.

**Horton, Robert E.,** Hydr. Engr., R.D. No. 1, Voorheesville, N.Y. (Jan. '11)

**Horton, Theodore,** Sandwich, Cape Cod, Mass. (July '07)

**Hosegood, Leslie A.,** Engr. & Asst. Supt., Munic. Water Dept., 195 D Street, San Bernardino, Calif. (Oct. '43) *M*

**Hoshall, Robert H.,** Cons. Engr., 65 McCall Pl., Memphis 3, Tenn. (Apr. '37)

**Hoskins, J. K.,** Asst. Surgeon Gen., Chief, San. Eng. Div., U.S. Public Health Service, Washington 14, D.C. (July '35) *P*

**Hoskinson, Carl M.,** Acting Supt., Div. of Water, 1140—43rd St., Sacramento, Calif. (June '28) *Fuller Award '43.*

**Hostettler, C. O.,** Chemist, Akron Water Purif. Plant, 128 E. Hall St., Kent, Ohio (Jan. '38) *MP*

**Hostrup, C. F.,** 543—9th St., Santa Monica, Calif. (Feb. '30)

**Hot Springs Municipal Water System,** R. H. Teed, Hot Springs National Park, Ark. (Corp. M. Mar. '20)

**Hotchkiss, Harry E.,** Purif. Mgr., Monmouth Consolidated Water Co., Red Bank, N.J. (July '39) *P*

**Hotchkiss, Henry T.,** Supervising Chemist, Larchmont, N.Y. (July '35)

**Hotler, Albert,** Supt., Goodland Munic. Water Works, Goodland, Ind. (Apr. '42)

**Hough, M. L.,** *see* Darling Valve & Mfg. Co.

**Houlton Water Co.,** J. N. Mullen, Supt., Houlton, Me. (Corp. M. July '43)

**Housel, Frank B.,** City Mgr., City Hall, St. Louis, Mich. (July '43)

**Houser, George C.,** 220 Clyde St., Brookline 67, Mass. (Nov. '25) *P*

**Houston Water Dept.,** Frank N. Baldwin, Asst. Director, Utilities Dept., City Hall, Houston 2, Tex. (Corp. M. Sept. '34)

**Houston, W. J.,** Agent, W. D. Taulman, 610 Red Rock Bldg., Atlanta 3, Ga. (Jan. '40)

**Houze, T. Y.,** Supt., Hercules Powder Co., Atlanta, Ga. (Jan. '44)

**Hovey, Victor M.,** c/o General Electric Co., Eau Claire, Wis. (Oct. '38)

**Hovis, B. J.,** Supt., Water Treatment Plant, Belmont Processing Co., Belmont, N.C. (Nov. '29) *P*

**Howard, Arthur W.,** Mayor, Water Com., City Hall, Bellingham, Wash. (Affil. Jan. '42)

**Howard, C. M.,** Engr., Concrete Pipe & Products Assn., 404 Arctic Bldg., Seattle 4, Wash. (Apr. '43)

**Howard, C. S.,** *see* Iowa Valve Co.

**Howard, Charles D.,** Director, Div. of Chemistry & Sanitation, State Board of Health, State House, Concord, N.H. (Feb. '21)

**Howard Charles S.,** Sr. Chemist, U.S. Geological Survey, Box 443, Albuquerque, N.M. (Jan. '43) *P*

**Howard, Edwin M.,** Civ. Engr.-Vice-Pres., Whitman & Howard, Inc., 2 Elmwood Court, Winthrop 52, Mass. (Apr. '44) *P*

**Howard, N. J.,** Director of Water Purif., Filtration Plant, Queen St. E. & Nursewood Rd., Toronto, Ont., Can. (June '20) *Director '34–'37, '41–'42. Vice-Pres. '40. President '41. Fuller Award '43. MP*

**Howard, Paul F.,** 138 Bartlett Rd., Winthrop, Mass. (Apr. '36)

**Howard Supply Co.,** F. H. Denman, 5125 Santa Fe Ave., Los Angeles 11, Calif. (Assoc. M. Oct. '43)

**Howe, B. V.,** Director, Div. of San. Eng., State Board of Health, 517 Majestic Bldg., Denver 2, Colo. (Apr. '30) *Fuller Award '40. P*

**Howe, Harvey S.,** 1506 Highland Drive, Silver Spring, Md. (Jan. '39)

**Howe, Henry L.,** City Engr., 52 City Hall, Rochester, N.Y. (Apr. '38)

**Howe, J. P.,** Town Engr., Pembroke, Ont., Can. (Mar. '28) *M*

**Howe, Max G.,** Engr., Columbia Supply Co., Box 1465, Columbia 1, S.C. (Jan. '38) *MP*

**Howell, Eugene M.,** Capt., Box 104, Tombstone, Ariz. (Jan. '37) ★

**Howell, W. Y.,** Supt., Board of Public Utilities, Paris, Tenn. (Jan. '42)

**Howland, E. Robert,** The British Pitometer Co., Victoria Station House, London, S.W. 1, England (Apr. '14)

**Howland, Lee,** Cons. Engr., 1863 Meadowbrook Rd., Altadena, Calif. (Jan. '41) *M*

**Howland, Warren E.,** Prof. of San. Eng., School of Civ. Eng., Purdue Univ., West Lafayette, Ind. (Apr. '34) *P*

**Howson, Joseph T.,** Sewage Plant Operator & Water Chemist, 116 Elm St., Westfield, N.Y. (July '43) *M*

**Howson, Louis R.,** Alvord, Burdick & Howson, Engrs., 20 N. Wacker Drive, Chicago 6, Ill. (Apr. '16) *Trustee '28–'30. Vice-Pres. '41. President '42. Director '43. Fuller Award '43. Diven Medal '44.*

**Hoy, C. W.,** Engr., General Water, Gas & Elec. Co., 15 Exchange Pl., Jersey City, N.J. (Jan. '42)

**Hoy, J. R.,** San. Engr., 402 Hildebrandt Bldg., Jacksonville 2, Fla. (Feb. '30) *Fuller Award '43. P*

**Hoy, Joseph A.,** Supervising Foreman, Water Dept., 18 E. Worcester St., Worcester 4, Mass. (May '22)

**Hoyt, Earle S.,** San. Engr., 568 E. Broad St., Columbus, Ohio (May '30)

**Hromada, Frank M.,** Passed Asst. San. Engr. (R), U.S. Southwestern Reformatory, El Reno, Okla. (Jan. '40) *P*

**Hubbard, E. C.,** Prin. San. Engr., State Board of Health, Raleigh, N.C. (Oct. '43) *P*

**Hubbard, Edward,** Specification Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Jan. '33)

**Hubbard, W. Hustace,** Pres., Elizabethtown Water Co., Box 96, Elizabethtown, N.Y. (July '41)

**Hubbell, George Edgar,** Secy., Hubbell, Roth & Clark, Inc., 2642 Buhl Bldg., Detroit 26, Mich. (Jan. '43) ★

**Hubbert, E. G.,** Water Supt., Omak, Wash. (Jan. '37) *A*

**Huber, Harold J.,** Supt. of Public Works, Lancaster Water Dept., 5214 Broadway, Lancaster, N.Y. (Oct. '42)

**Hubley, B. D.,** Mgr. of Philadelphia Office, Hersey Mfg. Co., 5068 McKean Ave., Philadelphia 44, Pa. (Jan. '44)

**Hudrlik, Otto L.,** Northwest Mgr., Flox Co., 1132 N.W. Glisan St., Portland 9, Ore. (Jan. '44) *P*

**Hudson Dept. of Public Works,** J. McClure Wardle, Supt. of Public Works, Hudson, N.Y. (Corp. M. Oct. '38)

**Hudson, Herbert E., Jr.,** Water Purif. Div., City Hall, Chicago, Ill. (May '33) *Fuller Award '42. P* ★

**Hudson, Leverne D.,** 333 E. 4th St., Flora, Ill. (Oct. '41) ★

**Hudson, Thomas L.,** Sr. Engr., War Production Board, 14 E. Read St., Baltimore, Md. (Oct. '43)

**Hudson, W. Rowland,** Engr. & Supt., California Water & Telephone Co., 2130 Huntington Drive, San Marino, Calif. (Jan. '39)

**Huffman, Benjamin F.,** Pres., Rockport Water Works Co., Inc., 219 Main St., Rockport, Ind. (May '29)

**Huffman, H. H.,** Supt., Water & Street Lighting Dept., Topeka, Kan. (June '32) *M*

**Hughes, George F.,** *see* Denver, City & County of

**Hughes, Gresham,** Mgr. & Secy., Mildura Urban Water Trust, Box 111, Mildura, Victoria, Australia (Apr. '38)

**Hughes, H. D.,** Mgr., S.W. Sales, American Cast Iron Pipe Co., Box 1491, Dallas 1, Tex. (Jan. '42)

**Hughes, S. C.,** *see* Deseronto Public Utilities Com.

**Hughes, W. P.,** City Engr. & Water Supt., City Hall, Lewiston, Idaho (Sept. '25) *Director '35–'38. Fuller Award '41.*

**Hughey, G. E., Jr.,** City Chemist & Supt. of Plants, 803 N. Center St., Statesville, N.C. (Oct. '41)

**Hulbert, Roberts,** Asst. Supt., Filtration Plant, Water Works Park, Detroit 14, Mich. (Apr. '30) *Fuller Award '42. P*

**Hull, Fred M.,** 1005 Jefferson Ave., East Point, Ga. (Apr. '40)

**Hulse, C. A.,** Chief Sales Clerk, Canadian Johns-Manville Co., Ltd., 199 Bay St., Toronto 1, Ont., Can. (Jan. '44)

**Hulteng, A. F.,** City Engr., Box 1018, Grand Forks, N.D. (Oct. '40) *P*

**Humason, N. J.,** Supt. of Filtration, Elyria Water Works, Lorain, Ohio (July '35)

**Humphreys, Walter,** Supt., Waste Water Disposal Co., 633 W. Fern Drive, Fullerton, Calif. (Oct. '41) *M*

**Hungerford, Churchill, Jr.,** Pres., Hungerford & Terry, Inc., Clayton, N.J. (Jan. '39) *P*

**Hunsicker, F. C.,** Supt., Maysville Water Co., Maysville, Ky. (Jan. '43)

**Hunt, Asa E.,** Mfr.'s Agent, 5219 Miller Ave., Dallas 6, Tex. (Jan. '44)

**Hunt, F. M.,** Supt., Light & Water Plant, Box 24, Seneca, S.C. (Apr. '29) *M*

**Hunter, Andrew,** *see* New Westminster, City of

**Hunter, G. A.,** Supt. of Gen. Constr., East Bay Munic. Utility Dist., 512—16th St., Oakland 12, Calif. (May '33) *M*

**Hunter, H. G.,** Asst. Engr. to W. S. Lea, 1226 University St., Montreal, Que., Can. (June '11)

**Hunter, Homer A.,** Supt., City Water Works, City Hall, Dallas 1, Tex. (July '41) *M*

**Hunter, T. B.,** Cons. Engr., 41 Sutter St., San Francisco 4, Calif. (July '06)

**Hurlbut, William W.,** Chief Engr. of Water Works & Deputy Gen. Mgr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (May '24) *Director '33–'36, '37–'38. President '37. Diven Medal '41. Fuller Award '41. Honorary M. '43. M*

**Hurst, Howard M.,** *see* Utah State Dept. of Health

**Hurst, J. B.,** Owner, Hurst Drilling & Equipment Co., 1528 N.W. 7th Ave., Miami 36, Fla. (July '44) *MP*

**Hurst, Wm. Donald,** Asst. City Engr., 223 James Ave., Winnipeg, Man., Can. (Apr. '34) *M*

**Hushbeck, Harold R.,** Outside Supt., Water Dept., City Hall, 268 Main St., Watsonville, Calif. (Jan. '39) *M*

**Hutchins, Will A.,** Supt., City Water Dept., Freeport, Ill. (Nov. '20) *MP*

**Hutchinson, Dale,** Water Comr., 45 S. Lake St., North East, Pa. (Jan. '40) *P*

**Hutchinson, Harry E.,** Treas., Princeton Water Co., 166 Nassau St., Princeton, N.J. (Apr. '39)

**Hutchison, A.,** Drummond, McCall & Co., Ltd., Box 219, Montreal, Que., Can. (May '21)

**Hutson, A. D.,** Supt., Water & Elec. Plant, Office of City Mgr., Gainesville, Fla. (Jan. '42) *MP*

**Hutto, Archie C.,** Distr. System Foreman, Arkansas Power & Light Dept., 819 W. 25th St., Pine Bluff, Ark. (Oct. '42)

**Hutton, C. W.,** Constr. Engr., California Water Service Co., 715 S. 6th St., San Jose 12, Calif. (Oct. '41) *M*

**Hutton, Harold S.,** San. Engr., Wallace & Tiernan Co., Inc., Box 178, Newark 1, N.J. (Apr. '20) *P*

**Hay, Harry M.,** Western New York Water Co., 11 Niagara St., Buffalo 2, N.Y. (July '36) *M*

**Hyatt, Chauncey A.,** Swimming Pool Sanitation Consultant, State Health Dept., 5555 Sheridan Rd., Chicago 40, Ill. (Apr. '43) *P*

**Hyde, Charles Gilman,** Cons. Hydr. & San. Engr. and Prof. Emeritus of San. Eng., Univ. of California, Berkeley 4, Calif. (July '07) *Honorary M. '39. Fuller Award '42. P*

**Hyde, Ralph H.,** Vice-Pres. & Gen. Mgr., The Campbell Water Co., Box 1, Campbell, Calif. (May '27) *M*

**Hydraulic Development Corp.,** West Medford Station, Boston, Mass. (Assoc. M. May '25)

**Hydraulic Supply Mfg. Co.,** Robert E. Russell, Engr., 7500—8th Ave., S., Seattle 8, Wash. (Assoc. M. Jan. '42)

**Hyman, H. H.,** Vice-Pres., Consumers Water Co., Box 3100, Miami 30, Fla. (Apr. '16) *Director '42–'45.*

**Idaho Dept. of Public Health,** H. C. Clare, Director, Div. of Public Health Eng., Boise, Idaho (Corp. M. Jan. '43)

**Idaho Surveying & Rating Bureau,** R. C. Stevenson, Box 1069, Boise, Idaho (Corp. M. Feb. '24)

**Idaho, Univ. of,** W. W. Tinniswood, Asst. Prof., Civ. Eng., Moscow, Idaho (Corp. M. Jan. '35)

**Ihling, Herbert M.,** Field Engr., Water Dept., City Engr.'s Office, City Hall, Milwaukee, Wis. (Jan. '40) ★

**Ilion Board of Water Comrs.,** Earle J. Trimble, Engr., Ilion, N.Y. (Corp. M. Mar. '24)

**Illinois Inspection Bureau,** C. W. Soderstrom, 309 W. Jackson Blvd., Chicago 6, Ill. (Corp. M. Jan. '24)

**Illman, N. H.,** Mgr., Turbine Engineering Co., 21 King St., E., Toronto 1, Ont., Can. (Apr. '43) *M*

**Imus, William,** Foreman, City Water Dept., 1400 Highland St., Manhattan Beach, Calif. (Oct. '43)

**Indiana Dept. of Conservation,** C. H. Bechert, 402 State Library Bldg., Indianapolis 9, Ind. (Corp. M. Jan. '38)

**Indiana, Public Service Co. of,** G. J. Oglebay, 800 Traction Terminal Bldg., Indianapolis 9, Ind. (Corp. M. Feb. '10)

**Indiana State Board of Health,** Bureau of San. Eng., Joseph L. Quinn Jr., Acting Chief Engr., 1098 W. Michigan St., Indianapolis 7, Ind. (Corp. M. June '26)

**Industrial Chemical Sales Div.,** 230 Park Ave., New York 17, N.Y. (Assoc. M. May '31)

**Industrial Engineering Co.,** Austin S. Joy, Box 457, Wilmington, Calif. (Assoc. M. Oct. '42)

**Infilco, Inc.,** P. F. Pew, 325 W. 25th Pl., Chicago 16, Ill. (Assoc. M. Nov. '15)

**Ingle, E. H.,** *see* Electro Rust-Proofing Corp.

**Inglee, Clinton,** Pres. & Gen. Mgr., National Water Main Cleaning Co., 30 Church St., New York 13, N.Y. (July '35) *Director '38–'41, '42–'45.*

**Inglewood Water Dept.,** D. H. Griffith, Supt., City Hall, Inglewood, Calif. (Corp. M. Oct. '38)

**Inglis, John, Co., Ltd.,** F. Y. Walters, 14 Strachan Ave., Toronto, Ont., Can. (Assoc. M. Apr. '43)

**Ingols, Robert S.,** Research Fellow, Florida Citrus Com., R. 2, Box 238A, Winter Haven, Fla. (Jan. '44)

**Ingram, William T.,** 256 Stanford Ave., Berkeley 8, Calif. (July '35)

**Institution of Water Engineers,** Thomas E. Hawksley, Pres., Parliament Mansions, Abbey Orchard St., London, England (Corp. M. July '44)

**Insull, William,** Div. Mgr., Water Utilities Service Corp., Munic. Management Co., 224 Depot St., Latrobe, Pa. (Jan. '41) *M*

**Interstate Lead Corp.,** M. A. Tarshis, Pres., 24–08—40th Ave., Long Island City, N.Y. (Assoc. M. July '41)

**Iowa Geological Survey,** H. G. Hershey, Assoc. State Geologist, Geology Annex, Iowa City, Iowa (Corp. M. Apr. '42)

**Iowa Valve Co.,** C. S. Howard, Vice-Pres., 812 Hubbell Bldg., Des Moines 9, Iowa (Assoc. M. Nov. '28)

**Irvine, L. E.,** Supt., Water Dept., Signal Hill 6, Calif. (Oct. '43) *M*

**Irvington Water Dept.,** William J. Eggerling, Supt., 85 Main St., Irvington, N.Y. (Corp. M. Oct. '43)

**Irwin, George S.,** Supt., Water & Sewage Dept., City Hall, Delaware, Ohio (Affil. Jan. '41) *MP*

**Irwin, Gifford M.,** City Engr., City Hall, Victoria, B.C., Can. (Nov. '33)

**Irwin, Wm. F.,** Sales Repr., Louisville Cement Co., 2012 Edgecliff Point, Cincinnati 6, Ohio (Oct. '38)

**Isaac, F. N.,** Hanford, Calif. (May '08)

**Isaacson, Claude N.,** Repr., Water Works Supply Co., 448 S. Hill St., Los Angeles 13, Calif. (Jan. '43)

**Isham, Orrin L.,** Supt., Oxnard Munic. Water Dept., Box 446, Oxnard, Calif. (Oct. '38) *AMP*

**Itter, Charles J.,** Engr. of Design, Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34) *M*

**Ives, C. D.,** Acting City Engr., Court House, Asheville, N.C. (Apr. '44) *M*

**Ivy, Jos. W.,** Western Sales Mgr., National Cast Iron Pipe Co., 1104 Land Bank Bldg., Kansas City, Mo. (July '42) *M*

**Jack, Allen,** Mgr., San Francisco Branch, Hersey Mfg. Co., 1045 Bryant St., San Francisco 3, Calif. (Oct. '41)

**Jack, Dwight L.,** Filter Plant Chemist, Natrona Water Co., 1211 Princeton Ave., Tarentum, Pa. (July '43)

**Jack, Grant R.,** *see* East York, Township of

**Jacklin, T. W.,** Adv. Director, *Engineering Contract Record*, 347 Adelaide St., W., Toronto 2, Ont. Can. (Jan. '41)

**Jackson, David J.,** Chemist, Tarentum Water Dept. 402 Allegheny St., Tarentum, Pa. (Jan. '40)

**Jackson, Howard M.,** City Clerk, Munic. Water Works, City Hall, Yorkton, Sask., Can. (Jan. '42)

**Jackson, James A.,** San. Engr., State Board of Health, 1098 W. Michigan St., Indianapolis 7, Ind. (Oct. '38)

**Jackson, Leslie A.,** Mgr., Munic. Water Works, Robinson Memorial Auditorium, Little Rock, Ark. (Apr. '36) *Fuller Award '44.*

**Jackson, R. A.,** Supt. of Water, 717 W. 4th St., Bonham, Tex. (Oct. '42)

**Jackson, T. B.,** Pres. & Gen. Mgr., Boise Water Corp., 623 Idaho St., Boise, Idaho (July '35)

**Jackson, William,** Supt., Water & Light Dept., 231 Christian Ave., Hubbard, Ohio (July '42)

**Jacobs, L. L.,** San. Engr., 2249 Central Ave., Augusta, Ga. (July '35)

**Jacobs, Nathan B.,** Pres., Morris Knowles, Inc., 1312 Park Bldg., Pittsburgh 22, Pa. (Sept. '30) *AMP*

**Jacobs, S. Willard,** Vice-Pres., Niagara Alkali Co., 60 E. 42nd St., New York 17, N.Y. (Feb. '19) *P*

**Jacobson, Alvin R.,** Supt. of Filtration, Water Dept., 900 E. 30th St., Kansas City 3, Mo. (Jan. '42) *P*

**Jacobson, E. E.,** Mgr., Lexington Water Co., 167 N. Upper St., Lexington 15, Ky. (Apr. '32) *Director '38–'41. M*

**Jacobson, Samuel,** Chemist, New Haven Water Co., 100 Crown St., New Haven 6, Conn. (Jan. '44) *P*

**Jacques, C. E.,** Asst. Supt., Water Dept., 1427 Pine St., Paso Robles, Calif. (July '43) *M*

**Jacques, Henry L.,** Engr. of Major Constr., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Sept. '31)

**Jagger, James E.,** Acting Asst. Secy., American Society of Civil Engrs., 33 W. 39th St., New York 18, N.Y. (July '35) *AMP*

**James, Elmo,** *see* Spokane, City of

**Jamestown Board of Public Utilities,** Water Div., Clayton O. Johnson, Supt., Jamestown, N.Y. (Corp. M. Jan. '39)

**Jansa, Victor,** Cons. San. Engr., AB Vattenbyggnadsbyrån, Humlegårdsgatan 29, Stockholm, Sweden (Jan. '44)

**Janzig, A. C.,** Sr. Chemist & Bacteriologist, Fridley Softening Plant, 43rd & Marshall St., N.E., Minneapolis 13, Minn. (Oct. '21) *P*

**Jarrett, J. M.,** Director, Div. of San. Eng., State Board of Health, Raleigh, N.C. (June '27) *P*

**Jarstad, Otto,** Supt. of Water Supply & Chlorination, Dept. of Water, R. No. 1, Box 2471, Bremerton, Wash. (Apr. '43)

**Jarvis, L. E.,** Supt., Water & Light Dept., Box 41, Cashmere, Wash. (July '35)

**Jasper Munic. Elec. & Water Dept.,** Jasper, Ind. (Corp. M. Apr. '39)

**Jayne, Emil F.,** *see* Centralia City Water Dept.

**Jeffrey, A. C.,** Supt., City Water, Light & Power Co., Market & Washington Sts., Rushville, Ind. (Apr. '43)

**Jeffrey Mfg. Co., The,** S. L. Tolman, Columbus, Ohio (Assoc. M. Apr. '37)

**Jeffs, D. W.,** Supt., Wingham Utilities Com., Wingham, Ont., Can. (Apr. '44)

**Jenkins, David,** New Jersey Zinc Co., Franklin, N.J. (Oct. '22)

**Jenkins, E. D.,** 803 Indiana St., Martins Ferry, Ohio (Apr. '36)

**Jenkins, E. J.,** Supt. of Purif., Philadelphia Suburban Water Co., 762 Lancaster Ave., Bryn Mawr, Pa. (Feb. '25) *P*

**Jenkins, Joseph Edwin,** Student Civ. Engr., 106 E. 20th St., Austin, Tex. (Jr. M. July '42) ★

**Jenks, Harry N.,** Cons. San. Engr., 345 Madrono Ave., Palo Alto, Calif. (Jan. '17) *MP*

**Jenks, Stanley,** *see* Ozone Processes, Inc.

**Jennings, A. E.,** Mgr., *Water & Sewage*, 341 Church St., Toronto 2, Ont., Can. (July '43)

**Jennings, Arthur J.,** City Director, Eng. & Water Dept., City Hall, Monroe, Mich. (Jan. '41)

**Jennings, Fred Huntington,** Supt. of Filtration, Dept. of Water, 1146 Boyd St., Watertown, N.Y. (July '38) *P*

**Jens, Stifel W.,** Horner & Shifrin, Cons. Engrs., 803 Shell Bldg., St. Louis 3, Mo. (Jan. '44) *MP*

**Jensen, Axel,** Supt. of Filter Plant, Hallock, Minn. (Apr. '43)

**Jensen, E., (Miss),** *see* Home Water Dist.

**Jensen, Emil C.,** 526 Hutton Bldg., Spokane 8, Wash. (Jan. '42) *MP*

**Jensen, Frank B.,** Supt., Council Bluffs City Water Works, Council Bluffs, Iowa (Jan. '35) *M*

**Jensen, J. Arthur,** 3935 Bryant Ave., S., Minneapolis 8, Minn. (Apr. '10) *Trustee '25–'27. Director '31–'33, '40–'41. President '40.* M

**Jensen, O. F.,** Mgr., Layne-Texas Co., Ltd., Box 9098, Houston 11, Tex. (July '38)

**Jenson, R. M.,** Supt. of Water Works Grand Forks, N.D. (July '35) *M*

**Jenson, Theodore Bruce,** Major, Corps of Engrs., U.S. Dist. Engr., Box 4970, Jacksonville, Fla. (Oct. '43) ★

**Jerauld, Henry Franklin,** Asst. Engr., Water Dept., 1040 Mamzanita Ave., Pasadena 3, Calif. (Oct. 43) *P*

**Jernigan, Harold N.,** Sales Engr., 136 Arcadia Park, Lexington, Ky. (Oct. '35)

**Jerome Water Co.,** Wm. A. Peters, Mgr., Jerome, Idaho (Corp. M. July '35)

**Jessen, John E.,** Supt., City Water Works, City Hall, Monmouth, Ill. (Jan. '42) *M*

**Jessup, Albert H.,** Chief Designing Engr., Leeds, Hill, Barrard & Jewett, 224 N. Segovia Ave., San Gabriel, Calif. (Oct. '43) *P*

**Jeup, Bernard H.,** Chem. Engr., Bureau of San. Eng. Labs., State Board of Health, 1098 W. Michigan St., Indianapolis 7, Ind. (May '25) *P*

**Jewell, Arthur G.,** Supt., Water Dept., Board of Water Supply, City Hall, Mount Vernon N.Y. (Jan. '42)

**Jewell, G. H.,** Dist. Mgr., Builders Iron Foundry, 122 S. Michigan Ave., Chicago 3, Ill. (Apr. '34) *P*

**Jewell, William V.,** Chief Bookkeeper, Dept. of Public Works, 630 Bergen Ave., Jersey City 4, N.J. (Nov. '27) *A*

**Jiannott, William,** Supt., Thornwood Water Dist., Thornwood, N.Y. (July '35) *M*

**Jodaitis, Ladislaus T.,** Asst. Public Health Engr. (R), State Board of Health, 458 State Office Bldg., Madison 2, Wis. (July '43) *P*

**John, Robert L.,** Dist. Engr., The Baker Engrs., 115 Shields St., Rochester, Pa. (July '43) *P*

**Johns-Manville Sales Corp.,** C. A. McGinnis, 22 E. 40th St., New York 17, N.Y. (Assoc. M. Mar. '33) *Director '43–'46.*

**Johnson, A. C.,** Bottlers' Service Dept., The Coca-Cola Co., 310 North Ave., N.W., Drawer 1734, Atlanta 1, Ga. (Jan. '42)

**Johnson, Carl,** Chief Operator, Water Plant, Ft. Leavenworth, 803 S. Broadway, Leavenworth, Kan. (Apr. '40) *MP*

**Johnson, Carl A.,** Water Service & Main Foreman, Los Angeles Water Dept., 5353 Berridge Rd., Los Angeles 32, Calif. (Jan. '42)

**Johnson City Water Dept.,** Arthur J. Merrill, Supt., Johnson City, N.Y. (Corp. M. Sept. '25)

**Johnson, Clayton O.,** Supt., Board of Public Utilities, Jamestown, N.Y. (May '34) *M*

**Johnson, Dewey W.,** Cast Iron Pipe Research Assn., 122 S. Michigan Ave., Chicago 3, Ill. (Jan. '37)

**Johnson, E. B.,** Meter Reader, Water Distribution, 825 N.W. Third Ave., Fort Lauderdale, Fla. (Jan. '44)

**Johnson, E. Harold,** Florida Repr., A. P. Smith Mfg. Co., Orlando, Fla. (Oct. '41)

**Johnson, E. M.,** *see* Raleigh Water Dept.

**Johnson, E. P.,** 418 Flannery Bldg., Station No. 13, Pittsburgh, Pa. (July '35) *P*

**Johnson, Edgar W.,** Water Works Engr., Water Dept., 4920—10th Ave., S., Minneapolis 7, Minn. (July '17) *Director '42–'45. AMP*

**Johnson, Edward E., Inc.,** W. M. Bollenbach, 2304 Long Ave., St. Paul 4, Minn. (Assoc. M. May '22)

**Johnson, Eric F.,** Assoc. Editor, American Water Works Assn., 500—5th Ave., New York 18, N.Y. (Jan. '42) ★

**Johnson, Floyd V.,** Salesman, Mueller Co., 1115 Clayton Ave., Nashville 4, Tenn. (Oct. '41)

**Johnson, Francis M.,** San. Engr., Dist. Health Dept., Murphy, N.C. (Oct. '37) ★

**Johnson, H. L.,** Chief Operator, Steam Pumping Station, Dept. of Water & Sewers, 2314 S.W. 15th St., Miami, Fla. (Oct. '42)

**Johnson, H. M.,** *see* Anaconda Copper Mining Co.

**Johnson, Howard A.,** 141 Howeland Circle, Danville, Va. (Nov. '28) *MP*

**Johnson, Jess B.,** Supt., Sturgeon Bay Utilities, City Hall Annex Bldg., Sturgeon Bay, Wis. (Nov. '31)

**Johnson, John D.,** Gen. Supt., Bureau of Water, 701 French St., Erie, Pa. (July '42)

**Johnson, L. E.,** *see* Wilson Water Works

**Johnson, Leon R.,** Co-Partner, Massey & Johnson, Cons. Engrs., Farr Bldg., Fairfax, Va. (Jan. '43)

**Johnson, Meredith E.,** State Geologist, State House Annex, Trenton 7, N.J. (Affil. July '38)

**Johnson, R. K.,** Dist. Sales Mgr., Darling Valve & Mfg. Co., 70 Pine St., New York 5, N.Y. (Jan. '28)

**Johnson, Robert M.,** Supervisor of Filtration, City Water Dept., Tampa 2, Fla. (Apr. '40) *P*

**Johnson, Samuel C.,** Chem. Engr., Dearborn Chemical Co., 1912 Straus Bldg., Chicago 4, Ill. (Apr. '23)

**Johnson, W. B.,** Supervisor, Bureau of Water, City Hall, Easton, Pa. (Jan. '37) *M*

**Johnson, W. H.,** Supt. of Water Works, Harrodsburg, Ky. (Feb. '31)

**Johnson, W. H.,** *see* Phoenix Meter Corp.

**Johnson, W. Scott,** Chief Public Health Engr., Div. of Public Eng. & Ind. Hygiene, State Office Bldg., Jefferson City, Mo. (Feb. '24)

**Johnson, Wayne W.,** San. Engr., 1849 Spaight St., Madison 4, Wis. (Oct. '43) *MP* †

**Johnston & Jennings Co., The,** *see* Rusta Restor Div.

**Johnston, Clark B.,** Pres.-Mgr., East Bethlehem Water Co., Fredericktown, Pa. (July '43) *MP*

**Johnston, E. W.,** Sr. San. Engr., San. Eng. Div., Ontario Dept. of Health, Parliament Bldgs., Toronto 2, Ont., Can. (Feb. '34) *P*

**Johnston, O. S.,** *see* Chateaugay Water Works Co.

**Johnstone, A. J.,** Supt., Illinois Water Service Co., 122 N. Walnut St., Champaign, Ill. (July '42) *M*

**Johnstone, Alan McC.,** Mgr., Water Softening Plant, Orangeburg Water & Light Plant, 79 Ellis Ave., Orangeburg, S.C. (Jan. '40) ★

**Joiner, John,** San. Engr., War Dept., 207 McKinley St., Harlingen, Tex. (July '43)

**Joliet, City of,** Joseph F. Whalen, Comr., 150 N. Ottawa St., Joliet, Ill. (Corp. M. Oct. '41)

**Jones, A. P.,** *see* Consolidated Chemical Industries, Inc.

**Jones, Allen A.,** Prin. Engr., War Production Board, 2611 Temporary R Bldg., Washington, D.C. (Oct. '43)

**Jones, Alton W.,** Chemist, U.S. Sugar Corp., Canal Point, Fla. (July '42) *P*

**Jones C. V.,** *see* Albert Lea Water Dept.

**Jones, Carl C.,** Sidney, Neb. (July '35) *M*

**Jones, Clark W.,** Supt. of Water Works, Dalton, Ga. (Apr. '36) *M*

**Jones, D'Arcy,** 150 S. Oak Knoll Ave., Pasadena 5, Calif. (Apr. '43)

**Jones, E. D.,** Supt., Brownfield Water Dept., Box 307, Brownfield, Tex. (Oct. '43)

**Jones, Earl F.,** Jersey Shore Water Co., Jersey Shore, Pa. (Mar. '27) *M*

**Jones, Everett M.,** *see* Simplex Valve & Meter Co.

**Jones, Frank Woodbury,** 1140 Leader Bldg., Cleveland 7, Ohio (May '23) *P*

**Jones, Fred D.,** Chief Meter Inspector, 305 City Hall, Spokane, Wash. (Jan. '38) *M*

**Jones, H. Seaver,** Pres., Centriline Corp., 90 West St., New York 6, N.Y. (July '22)

**Jones, Harvey P.,** Jones & Henry, Cons. Engrs., Toledo Trust Bldg., Toledo, Ohio (July '22)

**Jones, James, Co., Inc.,** M. B. Duke, 201 Leroy St., Los Angeles 12, Calif. (Assoc. M. Oct. '21)

**Jones, James E.,** Civ. Engr., Aqueduct Hydrography Sec., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '33)

**Jones, Max K.,** Mgr., Huntington Water Corp., Huntington 10, W.Va. (July '35) *M*

**Jones, Morris S.,** Chief Engr. & Gen. Mgr., Pasadena Water Dept., 319 City Hall, Pasadena 1, Calif. (Oct. '24) *M*

**Jones, Myron T.,** 2949 Neil Ave., Columbus 2, Ohio (July '42)

**Jones, Roy G.,** 3726 Walnut St., Bell, Calif. (July '42) *M*

**Jones, Sparks,** Sales Repr., Vinson Specialty Paint Co., Burgess Bldg., Jacksonville, Fla. (Oct. '43)

**Jones, T. A.,** Supt., City Water Dept., Fort Valley, Ga. (Nov. '43)

**Jones, T. E.,** San. Engr., Northern Field, Office of Post Engr., Tullahoma, Tenn. (Jan. '40) *M*

**Jones, T. Marshall,** Dist. Sales Engr., M & H Valve & Fittings Co., 618 Belleforte Ave., Oak Park, Ill. (Apr. '42)

**Jones, W. B.,** Pres., James Jones Co., Inc., 201 Leroy St., Los Angeles 12, Calif. (Oct. '31)

**Jones, W. Logan,** Clerk, Public Water Supply Dist. No. 2, Raytown, Mo. (July '44)

**Jones, William R.,** Chemist Operator, Fridley Softening Plant, 43rd & Marshall, N.E., Minneapolis, Minn. (Affil. Jan. '41)

**Joos, C. E.,** Mgr., Water Conditioning Div., Cochrane Corp., 17th & Allegheny Ave., Philadelphia, Pa. (Apr. '39)

**Jordan, D. E.,** Cia Cubana de Electricidad, Apdo. 129, Matanzas, Cuba (Jan. '41)

**Jordan, Harry E.,** Secy., American Water Works Assn., 500—5th Ave., New York 18, N.Y. (Oct. '19) *Director '31–'34, '35–'36. President '35. Diven Medal '36. Secretary '37–. Honorary M. '39. AMP*

**Jordan, Henri K.,** Pres., Canada Valve & Hydrant Co., Ltd., Brantford, Ont., Can. (July '41) *M*

**Jordan, William H.,** Asst. Supt. of Grounds & Chief San. Patrolman, East Bay Munic. Utility Dist., 512—16th St., Oakland, Calif. (May '33)

**Jorgensen, Homer W.,** 3948 Albatross St., San Diego, Calif. (Oct. '39) ★

**Joslyn, Ray O.,** Mgr., Layne-Western Co., 1010 W. 39th St., Kansas City 2, Mo. (May '30) *M*

**Jost, Charles F.,** Cons. Engr., Buck, Siefert & Jost, 112 E. 19th St., New York 3, N.Y. (July '35) *P* ★

**Joy, Austin S.,** *see* Industrial Engineering Co.

**Joyce, Charles V.,** Div. Engr., Washington Suburban Sanitary Dist., Hyattsville, Md. (Jan. '37) *M*

**Judd, Thomas H.,** Engr., Washington Water Power Co., Spokane, Wash. (Jan. '38) ★

**Judge, James H.,** Dist. Mgr., Neptune Meter Co., 130 N. Jefferson St., Chicago 6, Ill. (Apr. '34) *AM*

**Judson, H. T.,** Portland Mgr., Hersey Mfg. Co., 1231 N.W. Hoyt St., Portland 9, Ore. (Mar. '29)

**Judy, Lawrence B.,** *see* Skagit Co. Public Utility Dist. No. 1

**Juhlin, Charles,** *see* Aurora Water & Light Com.

**Junta Central de Aguas del Estado,** *see* Chihuahua

**Justus, O. H.,** Water Works Operator, City Water Works, Box 2037, Vienna, W.Va. (Affil. Jan. '40)

**Jutz, Charles E.,** Pres., St. Louis County Water Co., 6600 Delmar Ave., St. Louis 5, Mo. (Apr. '20)

**Kable, Edgar P.,** Gen. Mgr., York Water Co., 130 E. Market St., York, Pa. (Nov. '17) *MP*

**Kadinger, Fred,** Plant Supt., Com. on Public Works, Juneau, Wis. (Jan. '40)

**Kahn, James M.,** Sales Engr., Infilco, Inc., 3110½ Roswell Rd., N.E., Atlanta, Ga. (Jan. '34) *P*

**Kain, Ted H.,** Gen. Mgr., Water Co., 220 Locust St., Columbia, Pa. (Jan. '44) *A*

**Kaiser, Clarence T.,** San. Engr., Box 774, Atlanta 1, Ga. (July '42) *MP*

**Kaiser Co., Inc.,** R. C. Wilson, Iron & Steel Div., Box 217, Fontana, Calif. (Corp. M. July '43)

**Kalbfleisch, Oscur C.,** Supt., Water Dept., 127 W. 4th St., Mansfield, Ohio (Apr. '43)

**Kallin, Francis J.,** 3625 Mildred Ave., Wayne, Mich. (Jan. '44)

**Kaltenbach, Albert B.,** San. Engr., Whitman, Requardt & Assoc., 4122 Kathland Ave., Baltimore 7, Md. (Jan. '44)

**Kamloops, City of,** J. MacEwan, Supt., Water Works Dept., 112 Lorne St., Kamloops, B.C., Can. (Corp. M. Apr. '44)

**Kammer, Alton W.,** Asst. Constr. Engr., Bureau of Water Supply, 504 Rose Hill Terrace, Baltimore 18, Md. (Oct. '42)

**Kansas City Water Dept.,** Director, City Hall, Kansas City 6, Mo. (Corp. M. Feb. '15)

**Kansteiner, H. H.,** Mgr., Production & Distr., Water Works Dept., Leavenworth, Kan. (Apr. '37)

**Kantola, William V.,** Water Works Supt. & City Engr., Conneaut Water Dept., City Hall, Conneaut, Ohio (Apr. '43)

**Kapp, John J., Jr.,** Supt. & Operator, Water Dept., 378 Morrissee Ave., Haledon, N.J. (Jan. '44)

**Kappe, Stanley E.,** 5230 Massachusetts Ave., Friendship Station, Washington, D.C. (Apr. '32)

**Karr, Roy W.,** 5576 N.E. Sandy Crest Terrace, Portland 13, Ore. (Jan. '38)

**Kassay, Albert E.,** Supt., Water & Sewer Dept., North Tarrytown, N.Y. (June '29) *M*

**Kauffman, James B.,** Assoc. Engr., Bureau of Water Supply, 1307 W. Baltimore St., Baltimore, Md. (July '42)

**Kauffman, Winfield S.,** Asst. Civ. Engr., Bureau of Water Supply, 774 Linnard St., Baltimore, Md. (Oct. '42)

**Kaufman, R. A.,** Mgr., Port Chester Water Works, Inc., 25 Willett Ave., Port Chester, N.Y. (Jan. '42) *M*

**Kautz, Samuel F.,** Chem. Feeder Operator, City Water Works, 3114 Griesmer Ave., Hamilton, Ohio (July '43) *MP*

**Kavanagh, Gerald R.,** Dist. Mgr., Wallace & Tiernan Co., Inc., 922 Hamilton Bldg., Knoxville 02, Tenn. (July '39) *P*

**Kavanagh, J. P.,** Dist. Mgr., Wallace & Tiernan Co., Inc., 801 Boxley Bldg., Roanoke 11, Va. (Oct. '41) *P*

**Kaye, John R.,** Engineering Service Co. Ltd., Box 263, 14 Prince St., Halifax, N.S., Can. (July '43)

**Kear, Carl I.,** *see* Minersville, Munic. Authority of Borough of

**Kearney, E. W.,** State Board of Health, Morganton, N.C. (Jan. '30) ★

**Keasbey & Mattison Co.,** A. B. Spaulding, Sales Mgr., Pipe Div., Butler Ave., Ambler, Pa. (Assoc. M. Oct. '37)

**Keatley, Charles R.,** San. Engr., The Engineer Board, Fort Belvoir, Va. (Affil. Jan. '40) *P*

**Keef, Walter L.,** Mech. Engr. & Supt. of Utilities, Camp Mexia, Box 402, Mexia, Tex. (Oct. '43) *AMP*

**Keefer, Clarence E.,** 408 Kensington Rd., Baltimore 29, Md. (Feb. '20) *P*

**Keefer, Harold T.,** Sales & Service Repr., Neptune Meter Co., 2107 Grand Ave., Kansas City 8, Mo. (Oct. '43)

**Keeler, H. Y.,** Reg. Prof. Engr., Box 1448, Huntington, W.Va. (Apr. '41) *P*

**Keeler, Russell B.,** 609A E. Church St., Santa Maria, Calif. (Apr. '44) *MP*

**Keen, Chester W.,** Supt., Waynedale Water Co., Inc., 6901 Elzey St., Waynedale, Fort Wayne 6, Ind. (Jan. '43) *M*

**Keenan, F. E.,** Supt. of Water Works, Gunnison, Colo. (Oct. '29) *M*

**Keene, William,** Supt., Town of Pointe Claire, 293 Lakeshore Rd., Pointe Claire, Que., Can. (Jan. '44) *M*

**Keeping, Clarence A.,** Supt., Pumping Station, Winnipeg Water Works, McPhillips St. Pumping Station, Winnipeg, Man., Can. (Jan. '41)

**Kegebein, John F., Jr.,** 107-A Suburban Pkwy., Norfolk 5, Va. (Apr. '41) *P*

**Keils, Anthony,** Supt., Mt. Clemens Water Works, 38 Moross Ave., Mt. Clemens, Mich. (June '09)

**Keily, C. J.,** Vice-Pres. & Gen. Mgr., Jamaica Water Supply Co., 161–20—89th Ave., Jamaica, N.Y. (Nov. '29)

**Keinath, Wm. J.,** Salesman, L. I. Snodgrass Co., 18 E. 4th St., Cincinnati 2, Ohio (July '41)

**Keirn, K. A.,** Wallace & Tiernan Co., Inc., 171—2nd St., San Francisco 5, Calif. (July '35) *MP*

**Keis, F. J.,** Cons. Engr., 257 Broadway, Troy, N.Y. (Apr. '27) *P*

**Keith, J. Clark,** Gen. Mgr., Windsor Utilities Com., Canada Bldg., Windsor, Ont., Can. (Mar. '23) *Director '40–'43.*

**Keliher, Timothy,** Supt. & Mgr., Williamsport Water Co., Williamsport 1, Pa. (Feb. '17) *M*

**Kelleher, Jos. T.,** Supt., Martinez Water System, 626 Main St., Martinez, Calif. (Oct. '37) *AMP*

**Keller, S. K.,** Gen. Supt., Pinellas County Water System, Box 151, Clearwater, Fla. (July '38) *M*

**Keller, Wm. H.,** Mgr., Transite Pipe Section, Johns-Manville Sales Corp., 1000 Market St., St. Louis 1, Mo. (Jan. '44)

**Kelley, A. I.,** Personnel Co-ordinator, Bureau of Water Works & Supply, 207 S. Broadway, Los Angeles 12, Calif. (Jan. '40) ★

**Kelley, C. F.,** Supt., Napoleon Water Works & Elec. Lighting Plant, Box 110, Napoleon, Ohio (Jan. '39) *M*

**Kelley, C. H.,** Mgr., Butler Water Co., Butler, Pa. (July '24)

**Kelley, Frank,** Supt., Valhalla Water Dist., Valhalla, N.Y. (Jan. '40) *M*

**Kelley, Peter J.,** *see* Limestone Products Corp. of America

**Kellner, Hugh,** Chief Engr., City Water Works, 350 Moy Ave., Windsor, Ont., Can. (Feb. '23) *M*

**Kellogg, C. E.,** *see* Mount Morris Water Dept.

**Kellogg, James W.,** Asst. Director, State Lab. of Hygiene, Raleigh, N.C. (June '21) *Director '40–'43.*

**Kelly, J. B.,** Supt., Water Works Dept., Goderich Public Utilities Com., Goderich, Ont., Can. (Apr. '42)

**Kelly, Robert D.,** Engr., New York Fire Insurance Rating Organization, 400 E. Genesee St., Syracuse 2, N.Y. (Jan. '43)

**Kelsey, Reginald A.,** Star Route 1, Rosamond, Calif. (July '38)

**Kelso, Gilbert L.,** 707 Bauer Ave., Charleston 2, W.Va. (May '30) *P*

**Kemp, Harold A.,** *see* District of Columbia Water Dept.

**Kempkey, Augustus,** Cons. Engr., 409 Balboa Bldg., San Francisco 5, Calif. (June '23)

**Kendall, Theodore Reed,** Editor, *Contractors and Engineers Monthly*, 470 Fourth Ave., New York 16, N.Y. (Mar. '19)

**Kenily, Edward H.,** Secy., Water Dept., 835 Locust Ave., Zanesville, Ohio (Apr. '43)

**Kennedy, Anthony J.,** Engr., Water Dept., 3850 Mulberry St., Box 826, Riverside, Calif. (Jan. '43)

**Kennedy, Clyde C.,** Civ. Engr., Atlas Bldg., 604 Mission St., San Francisco 5, Calif. (Oct. '27) *P*

**Kennedy, James W.,** Hydr. Engr., Canadian Ingersoll Rand Co., Ltd., 27 Wellington St., E., Toronto 2, Ont., Can. (Apr. '43) *MP*

**Kennedy, M. E.,** *see* Kennedy Valve Mfg. Co.

**Kennedy, Robert C.,** Asst. Chief Engr. & Asst. Gen. Mgr., East Bay Munic. Utility Dist., 512—16th St., Oakland 4, Calif. (May '33) *M*

**Kennedy Valve Mfg. Co.,** M. F. Kennedy, Pres. & Treas., Elmira, N.Y. (Assoc. M. Mar. '11)

**Kennedy, W. M.,** Chemist in Charge of Filter Plant, City Water Dept., Box 529, Rock Hill, S.C. (Jan. '43) *M*

**Kenney, Norman D.,** Partner, Whitman, Requardt & Assoc., 1304 St. Paul St., Baltimore 2, Md. (Jan. '41) *P*

**Kennison, Karl R.,** Chief Engr., Metropolitan Dist., Water Supply Com., 20 Somerset St., Boston 8, Mass. (July '39) *P*

**Kennon, James H.,** Mng. Engr., Bureau of Water, 416 City-County Bldg., Pittsburgh, Pa. (Sept. '29) *Director '41–'44.*

**Kenny, Norbert J.,** Pittsburgh Equitable Meter Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. (Apr. '38)

**Kenosha Water Dept.,** James W. Myers Jr., Supt., Kenosha, Wis. (Corp. M. Apr. '37)

**Kent, Frederick S.,** 335 E. 205th St., New York 67, N.Y. (Apr. '42) ★

**Kent, R.,** *see* Williston Park, Inc. Village of

**Kentucky State Dept. of Health,** Charles M. Davidson, Director, Bureau of San. Eng., 620 S. 3rd St., Louisville 2, Ky. (Corp. M. Feb. '15)

**Kentucky Utilities Co.,** E. W. Brown, 159 W. Main St., Lexington, Ky. (Corp. M. Feb. '05)

**Kepner, Dana E.,** Mfr.'s Repr., 1921 Blake St., Denver 2, Colo. (Oct. '25) *Fuller Award '39.*

**Kerns, F. L.,** *see* Peru, City of

**Kerr, A. J.,** Gen. Sales Mgr., Pittsburgh Equitable Meter Co., 400 Lexington Ave., Pittsburgh 8, Pa. (July '44)

**Kerr, Harry O.,** Pres. & Mng. Director, The Kerr Engine Co., Ltd., 840 Walker Rd., Walkerville, Ont., Can. (Apr. '43)

**Kerr, S. Logan,** Hydr. Engr., 31 W. Allens Lane, Philadelphia 19, Pa. (Jan. '35) *M*

**Kershaw, Neil F.,** Hq. 5th Service Command, R & U. Bldg. 62, Ft. Hayes, Columbus, Ohio (Jan. '37) *MP* †

**Kerslake, James E.,** Supt. of Filtration, Water Purif. Plant, 3000 N. Lincoln Memorial Drive, Milwaukee 11, Wis. (May '30) *P*

**Ketcham, Harold B.,** Supt., Sea Cliff Water Co., 325 Prospect Ave., Sea Cliff, N.Y. (Jan. '44)

**Ketcham, Henry N.,** Mgr., Roslyn Water Dist., 18 Villa St., Roslyn, N.Y. (July '35)

**Ketcham, Valentine O.,** Pres. & Gen. Mgr., Stamford Water Co., 103 Summer St., Stamford, Conn. (July '26) *M*

**Keyak, Michael H.,** San. Engr., Water Purif. Div., San Francisco Water Dept., Millbrae, Calif. (Oct. '41) *P*

**Keys, Stanley W.,** *see* Keys Well Drilling Co.

**Keys Well Drilling Co.,** Stanley W. Keys, 413 N. Lexington Ave., St. Paul 4, Minn. (Assoc. M. Jan. '44)

**Kienle, John A.,** Land's End Farm, Grasonville, Md. (June '09) *Director '36–'38, '39–'42. Honorary M. '40.*

**Kiker, John E., Jr.,** State Health Dept., 35 Market St., Poughkeepsie, N.Y. (May '33) ★

**Kilcawley, E. J.,** Prof. of San. Eng., Rensselaer Polytechnic Inst., Troy, N.Y. (Oct. '42) *P*

**Killam, Elson T.,** Hydr. & San. Engr., 142 Maiden Lane, New York 7, N.Y. (Dec. '31)

**Killgreen, William S.,** Partner, Corwin & Co., Inc., 413 Medical Arts Bldg., Great Falls, Mont. (Apr. '43)

**Killian, Paul,** Mgr., Peoples Water Service Co., Brunswick, Ga. (Mar. '30) *M*

**Kilpatrick, G. R.,** Supt., Water Works, Box 784, Cisco, Tex. (Oct. '40)

**Kimball, Clyde L.,** Field Supt., City Water Dept., 1326 San Ysidro, Beverly Hills, Calif. (Oct. '43)

**Kimball, Jack H.,** Passed Asst. San. Engr. (R), U.S. Public Health Service, Federal Public Housing Authority, Seattle 5, Wash. (Apr. '44)

**Kimberley, Harvey D.,** Supt., Water Works Dept., Warsaw, Ill. (July '42)

**Kin, Stephen R.,** San. Engr., M3-B Cameron Court Apts., Raleigh, N.C. (Oct. '42) *M*

**Kincaid, Russell G.,** Assoc. Engr., Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City 2, Mo. (Apr. '44) *P*

**Kinderhook Water System,** Paul Patchin, Mayor, Kinderhook, N.Y. (Corp. M. July '43)

**King, Arthur C.,** Supt. & Clerk of Water Board, City Hall, Taunton, Mass. (Oct. '43) *M*

**King, George M.,** 493 Coral Ave., Bridgeton, N.J. (Oct. '41) *M*

**King, H. McKay,** Post Engr., Camp Campbell, Ky. (July '39)

**King, John C.,** Secy.-Treas., Public Utilities Com., Port Dover, Ont., Can. (Apr. '44)

**King, Kenneth K.,** Director of Public Works, City Hall, Kansas City 6, Mo. (July '40) *M*

**King, R. M.,** Chief Engr., Layne-Arkansas Co., Stuttgart, Ark. (July '38)

**King, Roy S.,** *see* Midland Public Utilities Com.

**King, W. L.,** *see* Hempstead, Inc. Village of

**Kingsley, George,** Canal Point, Fla. (July '35)

**Kingston, S. P.,** Public Health Engr., Minnesota Dept. of Health, 212 City Hall, Rochester, Minn. (July '42)

**Kingston, T. M. S.,** *see* Chatham Board of Water Comrs.

**Kingston Utilities Com.,** C. C. Folger, Gen. Mgr., Kingston, Ont., Can. (Corp. M. July '41)

**Kinnear, J. Milton,** Assoc. Civ. Engr., Bureau of Water Supply, 2823 Overland Ave., Baltimore 14, Md. (Jan. '42) *M*

**Kinney, E. F.,** Sales Engr., Wallace & Tiernan Co., Inc., 2204 E. Kessler Blvd., Indianapolis 5, Ind. (Apr. '38) *Fuller Award '44.*

**Kinney, James B.,** Mgr., Wallace & Tiernan, Ltd., 350 Sorauren Ave., Toronto 3, Ont., Can. (Jan. '37) *P*

**Kinsel, Harry L.,** c/o H. S. Myers, 14 Arden Rd., Newtonville 60, Mass. (July '35)

**Kipp, Ed.,** Supt., Marshfield Elec. & Water Dept., Marshfield, Wis. (Jan. '39)

**Kipp, W. H.,** Box 2328, Portland 14, Ore. (Apr. '40)

**Kirch, L. A.,** Engr., Public Service Co. of Indiana, Inc., 110 N. Illinois St., Indianapolis 9, Ind. (Jan. '44) *P*

**Kircher, A. M.,** City Engr., City Hall, Mankato, Minn. (Oct. '39) *AMP*

**Kirchman, William,** Supt., Filter Plant, Fairmont, W.Va. (May '31) *P*

**Kirchoffer, William Gray,** Prof. of San. & Hydr. Eng., 22 N. Carroll St., Madison 3, Wis. (Jan. '23) *P*

**Kirk, Jack W.,** Field Engr., International Water Supply, 12 Maitland St., London, Ont., Can. (Apr. '44)

**Kirk, Lawrence H.,** Service Engr., The Flox Co., Inc., 1409 Willow St., Minneapolis 4, Minn. (Apr. '39)

**Kirkpatrick, William,** Deputy Chief Engr., Water & Sewerage Board, Water Engr.'s Office, Cross Roads P.O., Jamaica, B.W.I. (July '34)

**Kitchener Water Com.,** J. C. Breithaupt, City Hall, Kitchener, Ont., Can. (Corp. M. Feb. '20)

**Kittrell, F. W.,** Stream Sanitation Lab., Tennessee Valley Authority, 55 Ferris Hall, Knoxville, Tenn. (July '35)

**Kivari, A. M.,** Pacific Coast Mgr., The Dorr Co., 811 W. 7th St., Los Angeles 14, Calif. (Sept. '31) *P*

**Klaer, Fred H., Jr.,** Assoc. Geologist, U.S. Geological Survey, 445 N. Pennsylvania St., Indianapolis 4, Ind. (Oct. '43)

**Klang, E. H.,** Supt., Water & Light Dept., Staples, Minn. (Apr. '39)

**Klang, Marvin,** Chief Examiner, Purchasing Dept., Water Board Bldg., Detroit 26, Mich. (Affil. July '41) *MP*

**Klassen, Clarence W.,** Chief San. Engr., State Dept. of Public Health, Springfield, Ill. (Jan. '35) ★

**Klaumann, Chas. H.,** Supt., Water Works, Iola, Kan. (Jan. '39) *M*

**Klaus, Fred J.,** City Engr., City of Sacramento, 207 City Hall, Sacramento 14, Calif. (Oct. '15) *M*

**Klebenow, Reinhold H.,** Supt. of Water Distr., 1430 W. Canal St., Milwaukee 3, Wis. (July '40) *P*

**Kleber, J. P.,** Eng. Service, Calgon, Inc., 300 Ross St., Box 1346, Pittsburgh, Pa. (July '41) ★

**Klein, Austin R.,** *see* Mishawaka City Water & Elec. Plant

**Klein, George C.,** 11 Ave. 20, Venice, Calif. (Apr. '36) *M* ★

**Klein, William I.,** Cons. Engr., 21 Maple Terrace, East Orange, N.J. (July '13)

**Kleinhenz, John E.,** Publicity & Adv., Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Apr. '44)

**Kleinsmith, Walter,** Supt., Water Dept., 387 Broadway, Woodburn, Ore. (Apr. '40) *M*

**Kleiser, Paul J.,** 424 N. 2nd St., Clarksville, Tenn. (Jan. '37)

**Klett Mfg. Co.,** Theodore J. La Manna, 179 E. 87th St., New York 28, N.Y. (Assoc. M. July '43)

**Kliment, W. P.,** *see* Crane Co.

**Klindt B., Pedro,** Apdo. 1251, Caracas, Venezuela, S.A. (Jan. '41)

**Klinker, L. I.,** Supt., Munic. Utilities, Garrett, Ind. (Apr. '43)

**Klotz, J. L.,** Dist. Mgr., Public Service Co. of Indiana, Inc., Noblesville, Ind. (Jan. '43)

**Knaff, A.,** *see* Burroughs Adding Machine Co.

**Knapp, Frank,** Supt., Water Dept., 12–80 Fourth St., Fair Lawn, N.J. (Jan. '40) *MP*

**Knapp, Peter T.,** 703 Murdock Rd., Baltimore, Md. (Jan. '42)

**Kneeland, H. C.,** Water Analyst, 51 S. Jackson Ave., Pittsburgh 2, Pa. (Apr. '39)

**Kneer, Vernon R.,** Asst. Engr., Alvord, Burdick & Howson, 1401 Civic Opera Bldg., Chicago 6, Ill. (Apr. '44)

**Knickerbacker, John,** Pres., Eddy Valve Co., 86 First St., Troy, N.Y. (June '13)

**Knight, G. Webber,** Mgr., Natrona Water Co., Natrona, Pa. (Dec. '25)

**Knittel, E. A.,** Lynden, Wash. (July '35)

**Knoedler, H. A.,** Western Mgr., Inertol Co., Inc., 64 S. Park, San Francisco 7, Calif. (Oct. '37)

**Knoell, Howard F.,** Town Mgr., Box 125, Orange, Va. (Oct. '41)

**Knoener, Chas. J.,** 405 W. 23rd St., New York 11, N.Y. (July '40) ★

**Knott, John J.,** 2070 E. Slauson Ave., Huntington Park, Calif. (Oct. '37)

**Knowles, C. R.,** 6319 Kenwood Ave., Chicago 37, Ill. (June '13) *Director '30–'33. MP*

**Knowlton, E. C.,** Gen. Mgr., Anniston Water Dept., Anniston, Ala. (Jan. '40)

**Knowlton, Kenneth F.,** Supt.-Chemist, Salem & Beverly Water Supply Board, Filtration Plant, Arlington Ave., North Beverly, Mass. (Jan. '43)

**Knox, W. H.,** 130 Webster Park Ave., Columbus, Ohio (Jan. '27) ★

**Knox, W. J.,** Civ. Engr. & Land Surveyor, Box 26, Miami Springs, Fla. (July '44)

**Knoxville Elec. Power & Water Board,** M. B. Whitaker, Supt., Water Bureau, 626 S. Gay St., Knoxville 11, Tenn. (Corp. M. May '23)

**Knudsen, H. A.,** Mech. & Elec. Engr. & Acting Distr. Engr., East Bay Munic. Utility Dist., Box 720, Oakland 4, Calif. (Oct. '37) *M*

**Kochendorfer, John S.,** Chemist, Dept. of Water, 1041 Wyoming St., Dayton, Ohio (Oct. '42)

**Koebig, Adolf H., Jr.,** Cons. Engr., 821 Rowan Bldg., 458 S. Spring St., Los Angeles 15, Calif. (July '34)

**Kolb, T. A.,** San. Engr., State Board of Health, Wade Hampton Bldg., Columbia, S.C. (Apr. '41) ★

**Kononoff, Alexis B.,** Cons. Engr., 621 N.W. 31 Terrace, Miami 37, Fla. (Oct. '43)

**Konsack, Walter W.,** Supt. of Water, Flossmoor, Ill. (July '42)

**Koon, Ray Emerson,** Stevens & Koon, Cons. Engrs., Spalding Bldg., Portland 4, Ore. (Feb. '22)

**Korff, Frank,** Chief Engr., Tonawanda Water Works, Chestnut St., Tonawanda, N.Y. (Apr. '40) *MP*

**Korves, Albert A.,** 245 Ross Park, Syracuse 8, N.Y. (July '35) *M*

**Koster, Roy F.,** 1201 S. Euclid Ave., Pasadena 2, Calif. (Aug. '27) *M*

**Kountz, R. Rupert,** Acting Chief Water Analyst, State Dept. of Health, State Hygienic Labs., Iowa City, Iowa (Apr. '41) ★

**Kowalchik, Stephen A.,** Sr. San. Engr., State Dept. of Health, State House, Trenton, N.J. (Oct. '43)

**Koyl, E. G.,** Field Engr., Infilco, Inc., 402 Swetland Bldg., Cleveland 15, Ohio (Jan. '43)

**Kozma, Albert B.,** Supt. of Sewage Plant, Box 281, Rutherford, N.J. (Affil. Jan. '44) *P*

**Kraft, Gerald G.,** Power Dept., Texas Refinery Co., Wilmington, Calif. (Jan. '43) *P*

**Kramer, Howard H.,** City Mgr., City Hall, Milton, Ore. (Jan. '41)

**Kramer, Warren A.,** State Board of Health, State Office Bldg., Jefferson City, Mo. (Mar. '27)

**Krassy, Charles M.,** Supt., Water Dept., Box 297, Manville, N.J. (Jan. '37)

**Krater, Frank B.,** Supt., Los Angeles Aqueduct, North Div., Los Angeles Dept. of Water & Power, Independence, Calif. (Jan. '41)

**Krause, John W.,** Chief Engr., La Grange Water Works, 131 S. Brainard Ave., La Grange, Ill. (Mar. '32)

**Krell, Abraham John,** Chemist & Bacteriologist, William Raisch & Assoc., Cons. Engrs., 227 Fulton St., New York 7, N.Y. (Apr. '39) ★

**Kreuch, Paul C.,** Dist. Mgr., Pittsburgh Equitable Meter Co., 122 S. Michigan Ave., Chicago 3, Ill. (Apr. '42)

**Krieger, John,** Supt., Consolidated Mutual Water Co., 845 Fenton St., Denver 14, Colo. (Oct. '41)

**Kriegsheim, Heinrich,** 200 W. 86th St., New York 24, N.Y. (May '15)

**Kriesel, Fred,** Supt., Water & Light Dept., Ortonville, Minn. (Jan. '39)

**Kroeber, F. Vale,** 415—8th Ave., Pelham 65, N.Y. (July '40) ★

**Kroeze, H. A.,** Director, Div. of San. Eng., State Board of Health, Jackson 113, Miss. (Jan '38) *P*

**Krogstadt, Arthur,** Supt., Water Dist. No. 45, Kings County, 10702—12th Ave., S.W., Seattle 66, Wash. (Apr. '43)

**Kroone, T. H.,** Dist. Mgr., The American Well Works, 320 Plymouth Bldg., Cleveland 15, Ohio (July '44)

**Kroschwitz, Fred,** Salesman, Mueller Co., 563 Cleardale Ave., Trenton 8, N.J. (July '40)

**Krueger, William,** *see* Tomahawk Munic. Water Utility

**Kruger, Albert L.,** 2152 Brookford Drive, Toledo 9, Ohio (July '42) *P*

**Krull, H. M.,** *see* Sterling, City of

**Krum, Harry J.,** City Chemist, City Lab., Jefferson & Lawrence Sts., Allentown, Pa. (July '39) *P*

**Krumm, Tahlman,** Cons. Engr., 65 Meadow Park Rd., Bexley, Columbus, Ohio (Jan. '38) ★

**Kuehn, Nicholas H., Jr.,** San. Engr., Water Purif. Div., 6843 Oglesby Ave., Chicago 49, Ill. (Jan. '40) *P*

**Kuester, John H.,** Gen. Supervisor, Board of Public Works, Niles, Mich. (June '23) *MP*

**Kugler, Martin B.,** Field Supt., Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (Oct. '43) *M*

**Kuhn, H. H.,** *see* Hardware & Supply Co., The

**Kuhns, Hayes R.,** The Leadite Co., Killbuck, Ohio (Sept. '30) *Fuller Award '42.*

**Kulin, Harvey J.,** Sales Engr., American Well Works, Box 5321—42nd Street Substation, Indianapolis, Ind. (Oct. '39) ★

**Kulp, W. Wilson,** *see* Home Water Co., The

**Kunigk, W. A.,** Supt., Water Div., 2903 N. 26th St., Tacoma 7, Wash. (Aug. '24) *Director '30–'32.*

**Kunkel, Martin F.,** Civ. Engr., 816 Woodside Pkwy., Silver Spring, Md. (Apr. '43)

**Kunkle, Charles W.,** Vice-Pres. & Gen. Mgr., Johnstown Water Co., 445 Tioga St., Johnstown, Pa. (June '24) *M*

**Kunz, Sol F.,** Chemist, Arkansas Ordnance Plant, Little Rock, Ark. (Oct. '43)

**Kupper, Charles J.,** Cons. Engr., Bound Brook, N.J. (June '29) ★

**Kuranz, A. P.,** Mgr., Water Utility, Waukesha, Wis.( Oct. '31) *Fuller Award '41. Director '43–'46. AM*

**Kure Beach Water Works,** L. C. Kure, Supt.-Owner, Kure Beach, N.C. (Corp. M. Oct. '42)

**Kure, L. C.,** *see* Kure Beach Water Works

**Kurtz, William C.,** Chemist, Western New York Water Co., Woodlawn Station, Buffalo 19, N.Y., (May '30) *P*

**Kuttler, W. S.,** 415 S. Main St., Laurinburg, N.C. (Oct. '42)

**Kydd, Paul M.,** Vice-Pres., Jamaica Water Supply Co., 124 Hilton Ave., Garden City, N.Y. (Dec. '31)

**Kyle, E. J.,** *see* Dresden, Town of

**Laase, William F.,** 871 Main St., Lewiston, Me. (May '24)

**Laberteaux, K. P.,** City Engr., Water Dept., Hastings, Mich. (Apr. '44)

**Labsap, A. H.,** Mgr., Water Dept., Longview, Wash. (Dec. '27) *P*

**Lacour, Leon,** Supt., Water Dept., Bunkie, La. (Oct. '43) *M*

**LaDue, Wendell R.,** Chief Engr. & Supt., Bureau of Water & Sewerage, 404 Municipal Bldg., Akron 8, Ohio (July '34) *Fuller Award '39. Director '39–'42. AM*

**La Fayette Water Works,** Glen J. Garman, Supt., La Fayette, Ind. (Corp. M. Dec. '37)

**Laferriere, Aime,** Sales Engr., Darling Bros., Ltd., 140 Prince St., Montreal, Que., Can. (July '43)

**Lafreniere, Theo. J.,** San. Engr., Quebec Board of Health, 89 Notre Dame, E., Montreal, Que., Can. (June '16) *Fuller Award '40. P*

**LaGrange Park, Village of,** Roy L. Wintermute, Water Dept., 447 N. Catherine Ave., LaGrange Park, Ill. (Corp. M. Apr. '44)

**Laguna Beach County Water Dist.,** Brayton S. Norton, Mgr., 306—3rd St., Laguna Beach, Calif. (Corp. M. May '27)

**Lake Forest Water Dept.,** G. Leland Watson, Supt., City Hall, Lake Forest, Ill. (Corp. M. May '27)

**Lake, Madeline Lynch (Mrs.),** Water Bacteriologist, Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34) *P*

**Lake, Town of, Water Utility Board,** Eugene J. Voelker, Supt. of Water Works, 4001 S. 6th St., Town of Lake, Milwaukee 7, Wis. (Corp. M. Jan. '41)

**Lakewood Water & Power Co.,** G. J. Strodthoff, Vice-Pres., 2965 E. Carson St., Long Beach 8, Calif. (Corp. M. Apr. '44)

**LaLiberte, Paul,** *see* Cutler-Magner Co.

**LaManna, Theodore J.,** *see* Klett Mfg. Co.

**Lamar, Atwood A.,** Asst. Supt., Palisades Del Rey Water Co., 427 Moscow St., Playa Del Rey, Calif. (Oct. '43)

**Lamar, W. B.,** Chief Engr., Munic. Light & Water Dept., 806 Cynthia St., Poplar Bluff, Mo. (Jan. '40)

**Lamar, William L.,** Assoc. Chemist, U.S. Geological Survey, Box 5065, Raleigh, N.C. (Jan. '37) *P*

**LaMarre, Rene J.,** Supervisor of Filtration, Detroit Dept. of Water, 8300 W. Warren Ave., Dearborn, Mich. (Jan. '35) *P*

**Lamb, Carter H.,** Vice-Pres., Jamaica Water Supply Co., 161-20—89th Ave., Jamaica 1, N.Y. (Jan. '38) *A*

**Lamb, Leonard J.,** Supt., Southfield Township Water Dept., 26080 Berg Rd., R. No. 3, Birmingham, Mich. (Apr. '43)

**La Mesa Lemon Grove & Spring Valley Irrigation Dist.,** Chester Harritt, Chief Engr. & Gen. Mgr., 4769 Spring St., La Mesa, Calif. (Corp. M. Apr. '39)

**Lamley, George E.,** Asst. Civ. Engr., Bureau of Water Supply, 2808 Goodwood Rd., Baltimore 14, Md. (Oct. '42)

**Lamon, Clarence D.,** Mgr., Water Works Board, E. Clark St., Prichard, Ala. (Oct. '43)

**Lamon, H. J.,** *see* Austin Board of Water, Elec., Gas & Power Comrs.

**Lamond, A. W.,** Water Analyst, Alexandria Water Co., R.F.D. 3, Alexandria, Va. (Feb. '32)

**LaMotte Chemical Products Co.,** Frank L. LaMotte, Pres., Towson, Baltimore 4, Md. (Assoc. M. May '26)

**LaMotte, Frank L.,** *see* LaMotte Chemical Products Co.

**Lampley, J. H.,** Mgr., Board of Water Comrs., Hendersonville, N.C. (Aug. '26) *M*

**Lampman, K. J.,** Water Works Supt., Public Utilities Com., Exeter, Ont., Can. (Jan. '37) *M*

**Lancaster, Ben E.,** Supt. of Water Works, Roanoke Rapids Sanitary Dist., Municipal Bldg., Roanoke Rapids, N.C. (Oct. '42) *A*

**Lancaster, Ralph H.,** Supt., City Water Dept., Kearney, Neb. (Apr. '43) *A*

**Landgraf, Geo. F.,** Water Dept. Engr., City Hall, Royal Oak, Mich. (Apr. '39) *M*

**Lane, John C.,** Sales Engr., Johns-Manville Sales Corp., 116 New Montgomery St., San Francisco 5, Calif. (Jan. '41)

**Lanford, Carl C.,** Supt., Com. of Public Works, Greer, S.C. (Oct. '41) *MP*

**Lang, Franklin,** Pres. & Gen. Mgr., Feedwaters, Inc., 140 Cedar St., New York 6, N.Y. (Feb. '30)

**Lang, Warner J.,** *see* Waterloo Water Works

**Lang, William H.,** Chemist, Newport News Water Works Com., R.D. No. 1, Denbigh, Va. (Oct. '42) *MP*

**Langdon, Paul E.,** Greeley & Hansen, 6 N. Michigan Ave., Chicago 2, Ill. (Oct. '41)

**Langelier, Wilfred F.,** Prof. of San. Eng., Univ. of California, Berkeley, Calif. (Feb. '23) *Goodell Prize '43.*

**Langhammer, E. G.,** E. G. Langhammer Co., Box 367, San Antonio 6, Tex. (Jan. '43) *P*

**Langner, Arnold W.,** Supt., Light & Water Dept., 105 Guilford St., Sheboygan Falls, Wis. (Oct. '41) ★

**Langston, J. H.,** Mfr.'s Agent, 3114 Zack St., Tampa 2, Fla. (July '38)

**Languell, Louie,** Supt., Salem Water Works, Salem, Ind. (Apr. '39)

**Lansdale Munic. Authority,** C. R. Ridington, Supt., Water Dept., Second & Chestnut Sts., Lansdale, Pa. (Corp. M. Jan. '44)

**Lansing Board of Water & Elec. Light Comrs.,** Otto E. Eckert, Gen. Mgr., Lansing 3, Mich. (Corp. M. June '29)

**La Porte Water Works,** Arthur Baker, Chief Engr., Lake & Tyler Sts., La Porte, Ind. (Corp. M. July '37)

**Laramy, Jack B.,** Repr., Worthington Pump & Machinery Corp., LaSalle Hotel, South Bend, Ind. (Apr. '44)

**Larkins, Thomas Hart,** Supt., Water Dept., East Liverpool, Ohio (May '29) *M*

**Larson, A. C.,** Asst. Engr., State Dept. of Health, University Campus, Minneapolis 14, Minn. (July '44) *P*

**Larson, C. C.,** Supt. of Water Purif., City Water, Light & Power Dept., 725 S. 4th St., Springfield, Ill. (July '43) *MP*

**Larson, Harry,** Box 86, Fort Lewis, Wash. (Oct. '41) ★

**Larson, Linné C.,** 3425 Amesbury Rd., Los Angeles, Calif. (Apr. '36) ★

**Larson, Thurston E.,** Chemist, Illinois State Water Survey, Urbana, Ill. (July '37) *P*

**Lasaga, Andres,** Technical Supervisor, Public Health Dept. of Mexico, Box 14, El Paso, Tex. (Jan. '43) *M*

**Lasell, Fred B.,** Chemist, Metropolitan Utilities Dist., 3023 Bondesson St., Omaha 12, Neb. (Jan. '34) *P*

**Lashbrook, Fred W.,** Supt., Paoli, Ind. (Apr. '44)

**Lassiter, Leroy Irving,** San. Engr., Consolidated Board of Health, Wilmington, N.C. (May '26) *P*

**Lasso, Alfredo F.,** Ing. Civ., Presidente Roca 736, Rosario de Santa Fe, Argentina, S.A. (Sept. '17)

**Latham, James K.,** Assoc., Howard K. Bell, Cons. Engrs., 553 S. Limestone St., Lexington 17, Ky. (Oct. '39) *P* ★

**Lathrop, Thomas R.,** San. Engr., 2328 Arlington Ave., Columbus 8, Ohio (Jan. '25) *Fuller Award '40. P*

**Lauer, C. O.,** Pres. & Gen. Mgr., Gardiner Elec. Light & Water Co., Gardiner, Mont. (July '31)

**Laughlin, Henry F.,** Chief Chemist, Industrial Chemical Sales Div., 1005 Jefferson Ave., Tyrone, Pa. (Jan. '36) *P*

**Launer, Nelson M.,** Mgr., 2505 E. Whittier Blvd., Whittier, Calif. (Oct. '37)

**Launer, R. E.,** Hillside Distribution Co., 2603 E. Whittier Blvd., Whittier, Calif. (Jan. '43) *M*

**Lauramore, Horace H.,** Salesman, Johns-Manville Sales Corp., 301 Hildebrandt Bldg., Jacksonville 2, Fla. (Oct. '42)

**Lauster, Kenneth C.,** Acting Director, Div. of Eng., State Dept. of Health, Bismarck, N.D. (Jan. '42)

**Lauter, Carl J.,** Chem. Engr., U.S. Eng. Office, 5900 MacArthur Blvd., Washington, D.C. (Apr. '22) *Fuller Award '42. P*

**Laux, Paul C.,** *see* Anderson, City of

**Lavelle, John,** Asst. Supt. of Meters & Services, Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '32) *M*

**Laverty, Finley B.,** Chief Hydr. Engr., Los Angeles Co. Flood Control Dist., 751 S. Figueroa St., Los Angeles 14, Calif. (Oct. '43) *MP*

**Lawrence City Water Dept.,** Frank E. Willey, Supt., City Hall, Lawrence, Kan. (Corp. M. Feb. '27)

**Lawrence, Frederick H.,** 145 W. Sharpnack St., Germantown, Philadelphia 19, Pa. (Mar. '24) *P*

**Lawrence, H. C.,** Water Supt., Powell Valley Rd. Water Dist., R. 14, Box 1592, Portland, Ore. (Affil. Jan. '40)

**Lawrence, R. E.,** Lt. Col., Corps of Engrs., Office of Chief of Engrs., Washington, D.C. (May '28) ★

**Lawrence, Robert L., Jr.,** Supt. & Chief Engr., Water Works Dept., City Hall, Nashville 3, Tenn. (June '34) *M*

**Lawrence, Walter Byron,** Student of San. Eng., Univ. of California, 1519 Walnut St., Berkeley 7, Calif. (Jr. M. Jan. '44) *M*

**Lawson, Hugh C.,** Mgr., Los Angeles Branch, Rensselaer Valve Co., 743 Subway Terminal Bldg., Los Angeles 13, Calif. (Apr. '37)

**Lawson, Oscar,** *see* Mimico Public Utilities Com.

**Lawson, Wilfrid S.,** Chief Penitentiaries Engr., Dept. of Justice, Ottawa, Ont., Can. (Apr. '42)

**Layne & Bowler, Inc.,** J. G. Gordon Jr., Pres., Box 215, Hollywood Station, Memphis 8, Tenn. (Assoc. M. June '16)

**Layne-Atlantic Co.,** R. R. Schweitzer, Chief Engr., Box 1568, Norfolk 1, Va. (Assoc. M. Apr. '30)

**Layson, C. S.,** *see* Harlan Munic. Water Works

**Lea, William S.,** Cons. Engr., 1226 University St., Montreal, Que., Can. (Jan. '24)

**Leach, Walter L.,** 2738 Temporary R Bldg., Jefferson Drive & 4th St., S.W., Washington 25, D.C. (July '43) *P*

**Lead Industries Assn.,** F. E. Wormser, Secy., 420 Lexington Ave., New York 17, N.Y. (Assoc. M. Jan. '38)

**Lead Lined Iron Pipe Co.,** Thomas E. Dwyer, Box 150, Wakefield, Mass. (Assoc. M. Oct. '98)

**Leadite Co., Inc., The,** George McKay Jr., Pres., Girard Trust Company Bldg., Philadelphia 2, Pa. (Assoc. M. Feb. '10)

**Leahey, Edward F.,** Supt. of Elec. Constr., Bureau of Water Works & Supply, 410 Ducommun St., Los Angeles 12, Calif. (July '42) *M*

**Learned, Albert P.,** Asst. Engr., Black & Veatch, Cons. Engrs., 4706 Broadway, Kansas City 2, Mo. (May '22)

**Leaver, C. O.,** Dist. Repr., Electro Rust-Proofing Corp., 4030 Chouteau Ave., St. Louis 10, Mo. (July '44)

**Leaver, Robert E.,** Dist. Public Health Engr., State Dept. of Health, 526 Hutton Bldg., Spokane 8, Wash. (Jan. '41) ★

**Leavitt, William F.,** Gen. Foreman, Fresno City Water Dept., Box 512, Fresno, Calif. (Oct. '38)

**Le Bosquet, M., Jr.,** Prin. Public Health Engr., U.S. Public Health Service, E. Third & Kilgour Sts., Cincinnati 2, Ohio (July '35) *P*

**Lechner, Bernard J.,** Office Mgr., Bureau of Water, 701 French St., Erie, Pa. (July '29) *A*

**LeClerc, Arthur B.,** Sales Engr., T. C., Heyward, 1408 Independence Bldg., Charlotte, N.C. (Jan. '40) *P*

**Lee, Charles H.,** Cons. Engr., 58 Sutter St., San Francisco 4, Calif. (Mar. '12)

**Lee, Chris C.,** Supt., Water & Light Com., Wisconsin Dells, Wis. (Jan. '43)

**Lee, David B.,** Chief Engr., State Board of Health, Box 210, Jacksonville, Fla. (July '41) ★

**Lee, Dorothy McCulloch,** *see* Portland Bureau of Water Works

**Lee, F. M.,** *see* Melbourne & Metropolitan Board of Works

**Lee, Frank O.,** Lee & Jorgensen, Cons. Engrs., Box 627, St. Petersburg 1, Fla. (July '35)

**Lee, John Douglas,** Lecturer, Dept. of Civ. Eng., Queen's University, Kingston, Ont., Can. (Oct. '43)

**Lee, Lester,** Cons. Engr., 2212 E. Linnwood Ave., Milwaukee 11, Wis. (Apr. '44) *M*

**Lee, Scott M.,** Supt., City Water Dept., 58 Newman Ave., Arcadia, Calif. (June '27)

**Lee, W. Howard,** Comr., Dept. of Public Works, Parsippany Troy Hills, Box 85, Denville, N.J. (Oct. '40)

**Lee, W. S., Jr.,** Pres., W. S. Lee Engineering Corp., Power Bldg., Charlotte, N.C. (Jan. '36) ★

**Leh, Willard,** Assoc. San. Engr., 1376 Perkiomen Ave., Reading, Pa. (Apr. '39) ★

**Lehman, Werner,** Chairman, Water Utility Com., 728 Michigan Ave., South Milwaukee, Wis. (Jan. '44) *M*

**Leifgren, A. H.,** *see* National Soap & Chemical Co.

**Leistikow, Wm. F.,** Supt., Water Works, City Hall, Wausau, Wis. (Jan. '41) *M*

**Leitch, Kelvin D.,** Treas., Arthur S. Leitch Co., Ltd., 1123 Bay St., Toronto, Ont., Can. (July '42) *P*

**Leland, Benn J.,** San. Engr., Cook County Public Health Unit, 737 S. Wolcott Ave., Chicago 12, Ill. (Jan. '42) ★

**Leland, Raymond I.,** State Dept. of Public Health, 404 Smith Bldg., Freeport, Ill. (Jan. '39) ★

**Le May, Andy L.,** Water Supt., Oroville, Wash. (Jan. '39)

**Lemert, R. C.,** Southwestern Sales Agent, U.S. Pipe & Foundry Co., 1204 Praetorian Bldg., Dallas 1, Tex. (Oct. '39)

**Lendall, Harry N.,** Head of Dept. of Civ. Eng. and Prof. of Munic. & San. Eng., College of Engineering, Rutgers Univ., New Brunswick, N.J. (Mar. '23) *Director '41–'44. MP*

**Lenert, Louva G.,** Assoc. Engr., Malaria Control, State Dept. of Public Health, 245 State Office Bldg., Atlanta, Ga. (Mar. '32) *Director '33–'36.*

**Lenger, Herman F., Jr.,** Asst. Civ. Engr., Bureau of Water Supply, 630 Tunbridge Rd., Baltimore, Md. (Jan. '43)

**Lenhardt, Laurence G.,** Gen. Mgr., Dept. of Water Supply, 735 Randolph St., Detroit 26, Mich. (June '20) *Fuller Award '40. Director '41–'44. M*

**Lenoir Water Dept.,** Stanford Harris, Supt., Lenoir, N.C. (Corp. M. Oct. '42)

**Leon D., Ernesto,** Cons. Engr., Apdo. 1404, Caracas, Venezuela, S.A. (Apr. '40)

**Leonard, H. W.,** Supt., Winlock Water Co., Winlock, Wash. (Apr. '43) *M*

**Leonard, Hobart,** Supt., The Virginia City Water Co., Virginia City, Nev. (July '42)

**Leonard, W. V.,** Director, Public Health Eng. & Sanitation, State Dept. of Health, Cheyenne, Wyo. (Apr. '39) *P*

**Leopold, F. O.,** Pres., F. B. Leopold Co., Inc., 422 First Ave., Pittsburgh 19, Pa. (Jan. '44) *P*

**Le Roy, Thomas H.,** *see* Franklin Square Water Com.

**Lessard, L. P.,** Mgr., Transite Pipe Sec., Johns-Manville Sales Corp., 222 N. Bank Drive, Chicago 54, Ill. (Apr. '42) *M*

**Lessley, Dillon,** Supt., Munic. Water Dept., Box 675, Fortuna, Calif. (Oct. '43)

**Lesslie, J. D.,** Chemist, Springs Cotton Mills, Fort Mill, S.C. (Apr. '42)

**Lesslie, John N., Jr.,** Supt. of Operations, Water & Sewage Dept., 310 W. Kerr St., Salisbury, N.C. (Jan. '39)

**Lester, G. M.,** Pres., Hinds County Water Co., Box 369, Jackson 104, Miss. (Jan. '44)

**Leveque, Roland J.,** Omega Machine Co., 9 Codding St., Providence 1, R.I. (Apr. '38)

**Leverin, Harald A.,** Wolfville, N.S., Can. (Jan. '36)

**Levie, Augustus Theodore,** Sr. Engr., Water Div., Office of War Utilities, War Production Board, 4312 N. 4th St., Arlington, Va. (Apr. '43)

**Levine, Max,** Prof. in Charge, Dept. of Bacteriology, Iowa State College, Ames, Iowa (Nov. '21) ★

**Levy, A. G.,** Engr. of Constr. & Surveys, 2840 E. 132nd St., Cleveland 20, Ohio (May '10) *P*

**Levy, A. Zabdiel,** Assoc. Engr., Bureau of Water Supply, 2605 N. Hilton St., Baltimore 16, Md. (Jan. '40) *M*

**Lewis, Albert W.,** Resident Mgr., U.S. Pipe & Foundry Co., 1150 E. 26th St., Cleveland 14, Ohio (Jan. '39)

**Lewis, Allen A.,** Water Treatment Engr., Fuel Economy Engineering Co., 510 New York Bldg., St. Paul 1, Minn. (Apr. '44) *P*

**Lewis, Ed. S.,** Mgr., Non-Corrosive Products Co. of Arizona, 611 N. 19th Ave., Box 1671, Phoenix, Ariz. (Jan. '43)

**Lewis, F. E.,** *see* Dow Magnesium Corp.

**Lewis, Fred J.,** Dean, School of Eng., Kirkland Hall, Vanderbilt Univ., Nashville 4, Tenn. (Jan. '39)

**Lewis, Geo. A.,** Hydrographer, Box 47, Independence, Calif. (July '34)

**Lewis, Harley A.,** Supt., Munic. Water Works, Mulberry, Ark. (Oct. '43)

**Lewis, J. E.,** Supt., Yorba Linda Water Co., Yorba Linda, Calif. (Oct. '29) *M*

**Lewis, John V.,** Dept. of Public Works, 54 Court St., Rochester 4, N.Y. (Feb. '21) *M*

**Lewis, Ray Cherry,** Southeastern Mgr., Neptune Meter Co., 254 Spring St., N.W., Atlanta, Ga. (Jan. '41)

**Lewis, Robert F.,** Reservoir Keeper-in-Charge, Bureau of Water Works & Supply, 543 N. Irving Blvd., Los Angeles, Calif. (Jan. '39)

**Lewis, W. M.,** Vice-Pres., Layne-New York Co., 431 Market St., Camden, N.J. (Jan. '37)

**Lewis, Willis H.,** San. Engr., State Dept. of Public Health, 426—6th Ave., N., Nashville 3, Tenn. (Jr. M. Jan. '43) *P*

**Lewistown Pipe Co.,** Paul L. Osweiler, Asst. Secy., Box 271, Fort Wayne, Ind. (Assoc. M. July '43)

**Ley, Peter,** Engr., Jamaica Water Supply Co., 161–20—89th Ave., Jamaica 2, N.Y. (Jan. '36) *MP*

**Libbey-Owens-Ford Glass Co.,** V. W. Frederick, Chief Chemist' Rossford, Ohio (Corp. M. Oct. '41)

**Libby, Frank D.,** Chemist, Kalamazoo Vegetable Parchment Co., Kalamazoo 99, Mich. (May '23)

**Liberty Water Works,** Joseph Griebel, Supt., Liberty, N.Y. (Corp. M. Dec. '43)

**Liddle, Elmo G.,** San. Engr., Dept. of Bldgs. & Safety Eng., 555 Clinton St., Detroit 26, Mich. (Apr. '43) *P*

**Liffen, John James,** Exec. Engr., Associated London Properties, Ltd., St. Ermins, Caxton St., Westminster, London, England (July '38)

**Lightbody, J.,** *see* Ridgetown Public Utilities Com.

**Lightfoot, H. C.,** *see* Payette Water Dept.

**Lill, John R.,** Field Supervisor, Sheppard T. Powell, 719 N. Milton Ave., Baltimore 5, Md. (Apr. '43) *P*

**Lilue, Enrique E.,** Chief Engr., Pump & Machinery Dept., Natl. Inst. of Sanitation, Apdo. 486, Caracas, Venezuela, S.A. (Oct. '39)

**Limestone Products Corp. of America,** Peter J. Kelley, Service Repr., 110 Sherman Pl., Jersey City 7, N.J. (Assoc. M. Apr. '41)

**Lincoln City Water & Light Dept.,** City Hall, Lincoln, Neb. (Corp. M. Mar. '19)

**Linden, Robert T.,** Asst. Plant Supervisor, Fort Meade Water Dept., 1222 N. Bentalou St., Baltimore 16, Md. (Apr. '43) *P*

**Linderman, S. E.,** Exec. Vice-Chairman, Cast Iron Pressure Pipe Institute, 1006 Earle Bldg., Washington 4, D.C. (Jan. '37) *M*

**Lindner, J. Leonard,** *see* Bayonne, City of, Water Dept.

**Lindsten, H. C.,** Dist. Mgr., Wallace & Tiernan, Ltd., 301 Bank of Hamilton Bldg., Winnipeg, Man., Can. (Dec. '29) *P*

**Lingnor, Larry H.,** *Water Works & Sewerage,* 330 S. Wells St., Chicago 6, Ill. (Apr. '42) *AMP* ★

**Link, Roy E.,** Supt., Walnut Park Mutual Water Co., 7216 Seville Ave., Huntington Park, Calif. (Jan. '42) *M*

**Lippert, Paul,** Engr. of Pumping Station Efficiency, 7148 E. End Ave., Chicago, Ill. (July '42)

**Lipton, Steve W.,** Cashier-Engr., Munic. Water Dept., Warren, Ark. (Jan. '43)

**Lischer, Vance C.,** Engr. in Charge of Production, St. Louis County Water Co., 6600 Delmar, St. Louis 5, Mo. (Jan. '35) *Goodell Prize '38. MP*

**Little, B. C.,** 94 Westminster Rd., Rochester 7, N.Y. (June '03) *Trustee '18–'20. President '21. Exec. Com. '22–'23. Secretary '26–'36. Secretary Emeritus '36–. Honorary M. '39.*

**Little Rock Munic. Water Works,** Dan M. Boone, Municipal Auditorium, Little Rock, Ark. (Corp. M. Jan. '38)

**Livingston, L. E.,** Dist. Repr., Atlas Mineral Products Co., 3921 Purdue St., Dallas 5, Tex. (Jan. '43)

**Livingston Water Dept.,** Ernest J. Bear, Supervisor of Water & Sewers, 107 Hillside Ave., Livingston, N.J. (Corp. M. Jan. '38)

**Livingstone, Bard,** *see* San Bernardino Board of Water Comrs.

**Ljunggren, Sigge,** Civ. Engr., Nybrogatan 20, IV, Stockholm, Sweden (Apr. '44)

**Lloyd, Ernest B.,** Chief Engr. & Chemist, Water Works, Elgin, Ill. (July '35)

**Lloyd, J. M.,** Supt., Water Dept., City Hall, Tyler, Tex. (Oct. '39)

**Lloyd, M. G.,** Asst. Supt., City Water Dept., 527 Acacia Ave., Hawthorne, Calif. (Oct. '43) *MP*

**Lloyd, M. P.,** *see* Hillsboro Water Dept.

**Lobb, John Everett,** San. Engr., City Health Dept., 6 Roberts St., Fargo, N.D. (July '43) *P*

**Lobley, Geo. W.,** 327 Maple St., Hammonton, N.J. (July '35)

**Lochridge, Elbert E.,** Engr., Water Dept., Box 1867, Springfield, Mass. (July '06)

**Lock Joint Pipe Co.,** F. F. Longley, Vice-Pres., Box 269, East Orange, N.J. (Assoc. M. Oct. '15)

**Lockwood, Frank G.,** Mgr., Lockwood & Co., Calle Moreno 750, Buenos Aires, Argentina, S.A. (Jan. '42)

**Lofquist, H. B.,** *see* Oakville Water & Light Com.

**Logan, J. Ross,** *see* Haddonfield Borough Water Dept.

**Logan, Kirk H.,** Chief, Underground Corrosion Section, National Bureau of Standards, Washington 25, D.C. (July '44)

**Lohman Bros., Inc.,** Frank Carlton, 1449 S. San Pedro St., Los Angeles 15, Calif. (Assoc. M. July '39)

**Lollar, Truman M.,** Chief Operator, Jones Mills Works, Aluminum Co. of America, Jones Mills, Ark. (Apr. '43) *M*

**Lompoc Light & Water Dept.,** E. A. Vaughan, Mgr., 118 N. H St., Box 456, Lompoc, Calif. (Corp. M. Apr. '30)

**Londo, Harold L.,** *see* Green Bay Water Dept.

**London Public Utilities Com.,** C. Eastwood, Office Mgr., City Hall, London, Ont., Can. (Corp. M. Apr. '09)

**Long Beach Water Dept.,** G. R. Wade, Gen. Mgr., 403 Municipal Utilities Bldg., Long Beach 2, Calif. (Corp. M. Oct. '31)

**Long, Gilbert E.,** Supt., Fairhaven Water Co., 6 Bridge St., Fairhaven, Mass. (Apr. '44)

**Long, John S.,** Supt., Water Dept., Tampa 2, Fla. (May '33)

**Long, Lester,** *see* American Cast Iron Pipe Co.

**Long, Wm. C.,** Engr., Chlorination & Sewage Disposal, E. I. DuPont Co., Inc., 1424 Thayer Drive, Richland, Wash. (Apr. '44) *P*

**Longley, F. F.,** Vice-Pres., Lock Joint Pipe Co., Box 269, East Orange, N.J. (July '07)

**Longwell, John S.,** Chief Engr. & Gen. Mgr., East Bay Munic. Utility Dist., Box 720, Oakland 4, Calif. (Oct. '31) *Director '42–'45.*

**Lord, Charles H.,** City Engr., 110 Crescent Pl., Ogdensburg, N.Y. (June '29) *M*

**Lordley, H. E.,** Plant Mgr., Filtration Plant, Rothesay Rd., Richmond, Va. (Jan. '36) ★

**Los Angeles Dept. of Water & Power,** H. A. Van Norman, Gen. Mgr. Retired, Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Corp. M. Apr. '10) *Director '39–'42.*

**Losee, James R.,** Engr. & Supt., Tarrytown Water Works, 21 Wildey St., Tarrytown, N.Y. (July '28)

**Loudenback, C. I.,** Chem. Engr., Dearborn Chemical Co., 310 S. Michigan Ave., Chicago, Ill. (Apr. '42)

**Louis, Leo,** Sr. San. Engr., State Board of Health, 1098 W. Michigan St., Indianapolis 7, Ind. (Jan. '42) *P*

**Louisville Water Co.,** Henry M. Gerber, Pres., 435 S. Third St., Louisville, Ky. (Corp. M. Apr. '09)

**Love, David,** Gen. Mgr., Miller & Stoutenburg, 614 Central Bank Bldg., Oakland, Calif. (Apr. '44)

**Lovejoy, J. W.,** Supt., Water & Light System, Laurens, S.C. (Apr. '30)

**Lovejoy, Walter L.,** City Engr. & Water Supt., 611 Third St., Hoquiam, Wash. (Jan. '36) *AMP*

**Lovejoy, Wm. H.,** Supt. of Filtration, Crescent Hill Plant, Louisville Water Co., Louisville 6, Ky. (June '08) *P*

**Lovejoy, William O.,** Chemist & Bacteriologist, Louisville Water Co., Frankfort Ave. & Reservoir Park, Louisville 7, Ky. (July '43) *P*

**Loveland, Chester H.,** Cons. Engr., 300 Montgomery St., San Francisco 4, Calif. (Oct. '24)

**Loveland, City of,** L. C. Osborn, City Engr., Loveland, Colo. (Corp. M. Apr. '26) *Director '34–'37.*

**Lovell, Joe W.,** Supt., Murfreesboro Water Dept., Box 144, Murfreesboro, Tenn. (July '38) *M*

**Lovett, Frank W.,** Engr., Link Belt Co., 300 W. Pershing Rd., Chicago, Ill. (July '44) *P*

**Loving, M. W.,** *see* American Concrete Pipe Assn.

**Lowe, Geo. R., Jr.,** Secy. & Gen. Mgr., Columbus Water Works, Columbus, Ga. (Jan. '38)

**Lowe, Harry Nicholas, Jr.,** San. Engr., The Engineer Board, Fort Belvoir, Va. (Apr. '44)

**Lowe, James C.,** Technical Asst., Sinclair Rubber, Inc., Box 5036, Houston 12, Tex. (Oct. '43) *MP*

**Lowe, R. P.,** *see* Proportioneers, Inc.

**Lowe, Robert P.,** San. Engr., War Relocation Authority, 1015 N. Kensington St., Arlington, Va. (Jan. '43)

**Lowe, Thomas M.,** Head Prof., Dept. of Civ. Eng., Alabama Polytechnic Institute, Auburn, Ala. (Jan. '37) *P*

**Lower Colorado River Authority,** Max Starcke, Gen. Mgr., American Statesman Bldg., Box 1153, Austin 3, Tex. (Corp. M. Jan. '44)

**Lower, J. R.,** Chemist-in-Charge, Bucyrus Water Works, Bucyrus, Ohio (Sept. '27) *P*

**Lowery, J. D.,** *see* American Cyanamid & Chemical Corp.

**Lowry, Fred,** *see* Glendora Water Dept.

**Lowther, Burton,** Cons. Engr., 710 Colorado Bldg., Denver, Colo. (June '21) *Director '31–'34. P*

**Loyd, H. J.,** Supt., Connersville Water Works, 1330 Grand Ave., Connersville, Ind. (Oct. '41)

**Lozier, William S.,** Cons. Engr., 10 Gibbs St., Rochester 4, N.Y. (July '35)

**Lubow, Louis A.,** Chemist, Water Dept., 1012 N. Gregson St., Durham, N.C. (Apr. '39) ★

**Luby, William,** *see* Troy Bureau of Water

**Lucas, Glenn,** Foreman, Metropolitan Water Dist., Box 248, Lomita, Calif. (Oct. '43)

**Luce, Arthur T.,** New York Water Service Corp., 90 Broad St., New York 4, N.Y. (Apr. '19) *M*

**Lucey, Patrick J.,** Box 2, Des Plaines, Ill. (July '39)

**Luchessa, J. J.,** Mech. Supt., Miami Copper Co., Box 100, Miami, Ariz. (Jan. '40)

**Luchtenberg, R. O.,** 256 N. Ardmore Rd., Columbus, Ohio (July '44)

**Ludlow, R. S.,** Supt., Kendallville Light & Water Dept., Kendallville, Ind. (Oct. '39)

**Ludlow Valve Mfg. Co., Inc.,** Troy, N.Y. (Assoc. M. Mar. '82)

**Ludwig, Harvey F.,** Asst. San. Engr., U.S. Public Health Service, 1014 S. Harbor View Ave., San Pedro, Calif. (July '39) *Goodell Prize '43. P*

**Luebben, Thos. E.,** Plumbing Contractor, Box 525, Dillon, Mont. (Jan. '44)

**Luebbers, Ralph H.,** Chem. Eng. Dept., Univ. of Missouri, Columbia, Mo. (Jan. '36) ★

**Lugo, Thomas A.,** Draftsman, Bureau of Water Works & Supply Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34) *M*

**Luippold, G. T.,** Mgr., Luippold Engineering Sales Co., 405 N. Kilkea Drive, Los Angeles 36, Calif. (Feb. '24) *P*

**Lund, Armon,** Asst. Chemist, City Water Dept., Lincoln St. & Sheridan Rd., Evanston, Ill. (Jan. '41) ★

**Lundberg, A. T.,** Chief Engr., Arlington County Water Dept., Courthouse, Arlington, Va. (Jan. '36)

**Lundquist, Harry,** Repr., Neptune Meter Co., 5228 Brookview Ave., Edina, Minneapolis 10, Minn. (July '35)

**Lurvey, Donald T.,** c/o Theodore Scherer, R.R. 6, Olney, Ill. (Jan. '43) ★

**Luther, Robert W.,** Plant Supt., Public Utility Com., Box 56, Elizabeth City, N.C. (Jan. '30) *P*

**Luthin, John C.,** San. Eng. Div., State Dept. of Health, Phoenix, Ariz. (Jan. '40) *P*

**Lutz, Howland C.,** Asst. Sanitarian (R), U.S. Public Health Service, State Board of Health, Jacksonville 1, Fla. (July '39)

**Lutz, Lloyd H.,** *see* Ocala Water Dept.

**Lux, Kathleen F. (Miss),** Asst. San. Engr., State Board of Health, 1915 E. Riverside Drive, Indianapolis, Ind. (Jr. M. Oct. '42) ★

**Lyles, Joseph E.,** Chemist, Tampa Filtration Plant, Tampa, Fla. (Jan. '27) *Fuller Award '38.* ★

**Lyman, William J.,** Southern Sales Mgr., National Cast Iron Pipe Co., Box 2542, Birmingham 2, Ala. (Jan. '36)

**Lynbrook, W. M.,** *see* Greensboro Water Dept.

**Lynchburg Foundry Co.,** C. R. Spencer, Gen. Sales Mgr., Lynchburg, Va. (Assoc. M. June '16)

**Lynde, Earl J.,** Asst. Engr., Pasadena Water Dept., 319 City Hall, Pasadena 1, Calif. (Jan. '41) *P*

**Lyndes, Harry E.,** Mgr., Technical Service Office, General Chemical Co., Osage & W. Bayaud Sts., Denver, Colo. (Jan. '41)

**Lynn, A. B.,** Mgr., South Pittsburgh Water Co., 238 Brownsville Rd., Pittsburgh 10, Pa. (May '30)

**Lynwood, City of,** Robin A. Graves, Water Supt., Lynwood, Calif. (Corp. M. Jan. '44)

**Lyon, Lawrence H.,** Supt., California Water & Telephone Co., 439 Tyler St., Monterey, Calif. (Oct. '38)

**Lyon, Martin,** Supt., Water & Elec. Plant, Clintonville, Wis. (Oct. '41)

**Lyons, E. E.,** Clerk-Treas., Corp. of Township of Ancaster, Ancaster, Ont., Can. (Jan. '44) *A*

**Lysons, Edw.,** Supt., Water Dept., 429 Glen St., Snohomish, Wash. (July '40) *M*

**M & H Valve & Fittings Co.,** J. W Spradley, Sales Mgr., Anniston, Ala. (Assoc. M. Feb. '30)

**Maas, W. A.,** Supt. of Public Works, City Hall, Lindsay, Calif. (Oct. '41)

**Mabbs Hydraulic Packing Co.,** John W. Mabbs, 431 S. Dearborn St., Chicago 5, Ill. (Assoc. M. May '23)

**Mabbs, John W.,** *see* Mabbs Hydraulic Packing Co.

**Mabee, William C.,** Retired Engr., Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Dec. '24) *Director '36–'37. Diven Medal '38. Fuller Award '38. MP*

**Macdonald, Alan T.,** Town Engr., Kentville Water Works Dept., Kentville, N.S., Can. (July '42) *P*

**MacDonald, C. C.,** Secy., West Virginia Water Service Co., 814 Peoples Bank Bldg., Charleston 1, W.Va. (Oct. '29) *AM*

**MacDonald, D. R.,** City Engr. & Water Supt., 819 Front Ave., Bismarck, N.D. (July '43)

**MacDonald, Edward,** Comr., Water Dept., Melvindale, Mich. (Aug. '32)

**Macdonald, Frank P.,** Mgr., Central Div., Electro Rust-Proofing Corp., 407 S. Dearborn St., Chicago 5, Ill. (Jan. '43)

**MacDonald, Gerald C.,** Director of Wards Bureau of Standards, Montgomery Ward & Co., 618 W. Chicago Ave., Chicago, Ill. (Jan. '41)

**MacDonald, R. I.,** Asst. Engr., Alvord, Burdick & Howson, 1401 Civic Opera Bldg., Chicago 6, Ill. (Oct. '41)

**MacDonald, W. E.,** City Water Works Engr., 330 Driveway, Ottawa, Ont., Can. (May '17) *AM*

**MacDonald, W. M.,** Supt., Public Utilities Com., Kincardine, Ont., Can. (Jan. '44) *P*

**MacDowell, Rollin F.,** Cons. San. Engr., 401 Chester-Twelfth Bldg., Cleveland 14, Ohio (July '37) *P*

**MacDuff, Harry W.,** Supt., Dept. of Water Supply, 235 Wessen St., Pontiac 15, Mich. (Oct. '43) *M*

**Mace, H. H.,** Capt., 2233 Piedmont Ave., Wichita Falls, Tex. (Oct. '37) ★

**Mace, O. E.,** Chief Chemist, Pere Marquette Ry. Co., Wyoming Yards, Grand Rapids 2, Mich. (Aug. '33) *P*

**MacEwan, J.,** *see* Kamloops, City of

**MacGregor, David,** Comr., Passaic Valley Water Com., 152 Market St., Paterson 1, N.J. (Oct. '43)

**MacGregor, John Cameron,** Mgr., Jewell Filter Co., Ltd., Mercantile Bldgs., Calcutta, India (Jan. '39) ★

**Machado, Luis,** Secy., Acueducto de Colon, S.A., San Ignacio 303, Havana, Cuba (Jan. '41)

**Machis, Alfred,** 867 Hollins St., Baltimore 1, Md. (Jr. M. Apr. '43) *P*

**MacKall, Murray R.,** Hydr. Engr., California Railroad Com., 368 State Bldg., San Francisco 2, Calif. (May '27) *AMP*

**MacKenzie, James T.,** Chief Metallurgist, American Cast Iron Pipe Co., Box 2603, Birmingham 2, Ala. (Jan. '40)

**MacKenzie, Vernon G.,** San. Engr., U.S. Public Health Service, 2000 Massachusetts Ave., N.W., Washington 14, D.C. (July '43)

**MacLachan, A.,** 1740 E. 12th St., Cleveland 14, Ohio (July '38)

**MacLaren, James F.,** Gore & Storrie, Cons. Engrs., 1130 Bay St., Toronto 5, Ont., Can. (Jan. '35)

**MacLean, J. D.,** *see* Timmins, Corp. Town of

**MacLean Weir, Ltd.,** Robert M. Weir, Mng. Director, Box 2463, North Vancouver, B.C., Can. (Assoc. M. Apr. '44)

**Macnab, Ira P.,** Comr., Regulatory Com., Novia Scotia Board of Public Utilities, 195 Hollis St., Halifax, N.S., Can. (July '43)

**MacNee, R. B.,** Service & Sales Mgr., Monolith Portland Cement Co., 215 W. 7th St., Los Angeles 14, Calif. (Oct. '43)

**MacNicol, N.,** *see* Forest Hill Water Works System

**Macon Board of Water Comrs.,** Cliff T. Williamson, City Hall, Macon, Ga. (Corp. M. Apr. '29)

**MacPherson, Roderick,** 4800 Kimbark Ave., Chicago 15, Ill. (Jan. '41)

**MacQuarrie, Beverly Alexander,** Chief Operator, Treatment Plant, Water Dept., 515 N.E. 1st St., Fort Lauderdale, Fla. (July '43) *M*

**Macqueen, Philip O.,** Sr. Engr., Water Supply, Washington Aqueduct, 3031 Sedgwick St., N.W., Washington 8, D.C. (May '24) *P*

**MacTaggart, A. B.,** *see* Rusta Restor Div.

**Maddox, A. K.,** Field Repr., Reconstruction Finance Corp., 2905 Peachtree Rd., Atlanta, Ga. (Affil. Apr. '41) *M*

**Maddox, Walter,** Mayor, Sulligent, Ala. (Apr. '43)

**Madison Suburban Utility Dist. of Davidson County,** Madison, Tenn. (Corp. M. Apr. '38)

**Maffitt, Dale L.,** Secy. & Gen. Mgr., Des Moines Water Works, Des Moines 7, Iowa (Apr. '18)

**Maffitt, Howard C.,** Cons. Chemist, 522–26 Eleventh St., Des Moines 9, Iowa (Dec. '26) *P*

**Maffitt, M'Kean,** Supt. of Water Dept., Wilmington, N.C. (Dec. '22) *M*

**Maggs, Percy J.,** Box 423, Wetaskiwin, Alta., Can. (Jan. '37) *P* ★

**Maglott, Donald S.,** Dist. Engr., State Dept. of Health, 127 Troupe Ave., Bowling Green, Ohio (Apr. '44) *P*

**Magness, Don,** Supt., Harrison Water Works, Harrison, Ark. (Oct. '43)

**Maguire, John J.,** 618G Suffolk Manor, Broad & Clearview Sts., Philadelphia 41, Pa. (Jan. '43) *P*

**Magwood, W. H.,** Town Engr., Cornwall, Ont., Can. (Jan. '42)

**Maher, John C.,** Assoc. Geologist, U.S. Geological Survey, 217 Federal Bldg., Tulsa, Okla. (Oct. '43)

**Mahlie, Winfield S.,** Chemist-in-Charge, Filtration Plant, Fort Worth 1, Tex. (Feb. '23) *P*

**Mahoney, E. A.,** *see* Albion Water Dept.

**Mahoney, Thomas H.,** Supt., Water Dept., 245 Broadway, Methuen, Mass. (Oct. '39)

**Maier, Franz J.,** Dist. Engr., U.S. Public Health Service, Dist. 2, 204 Public Health Methods Bldg., National Institute of Health, Bethesda 14, Md. (Jan. '41) *MP*

**Maier, L. H.,** Sales Engr., Johns-Manville Sales Corp., Box 1199, San Antonio 6, Tex. (Jan. '43)

**Main, T. C.,** Asst. Engr., Ducks Unlimited (Canada), 201 Bank of Commerce Bldg., Winnipeg, Man., Can. (Jan. '37)

**Maker, Leonard Alburn,** Operator, Water Dept., 1615 Sutter St., Vallejo, Calif. (Apr. '42)

**Malcolm, William Lindsey,** Director, School of Civ. Eng., Cornell Univ., Ithaca, N.Y. (Mar. '34) *MP*

**Mallalieu, Willard,** Jersey City Water Works, Box 188, Boonton, N.J. (Dec. '14) ★

**Mallery, Melvin,** Dist. Mgr., Public Service Co. of Indiana, Crawfordsville, Ind. (Jan. '42)

**Mallmann, Walter LeRoy,** Prof. of Bacteriology & Research Prof. in Michigan Eng. Expt. Station, Michigan State College, East Lansing, Mich. (Jan. '38) *Fuller Award '41. P*

**Mallstrom, Roe E.,** Supt. of Water, 100 E. 154th St., Harvey, Ill. (July '42)

**Malmgren, G. V.,** *see* Graver Tank & Mfg. Co., Inc.

**Malone, J. R.,** Chemist, Durham Water Dept., 1312 N. Gregson St., Durham, N.C. (Oct. '39)

**Maloy, L. Ernest,** Water Works Engr., San Bernardino Water Dept., 195 D St., San Bernardino, Calif. (Oct. '43)

**Malster, E. L.,** Mgr., York Water Co., York, Neb. (Jan. '40)

**Mamrelli, Emil S.,** Asst. Civ. Engr., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34) *M*

**Manahan, Elmer G.,** 35 Ridgeway St., Mount Vernon, N.Y. (June '09) *P*

**Mangones, Robert J.,** 409 College Ave., Ithaca, N.Y. (Jr. M. Jan. '43)

**Mangun, L. B.,** Chemist, Board of Public Utilities, Kansas City 16, Kan. (Feb. '20) *P*

**Manhasset-Lakeville Water Dist.,** Board of Water Comrs., George L. Gehrig, Secy., 3 Gaynor Ave., Manhasset, N.Y. (Corp. M. July '41)

**Mann, John J.,** Dist. Supt., Elizabethtown Water Co., Dunellen, N.J. (Oct. '43)

**Mann, Karl,** *Water Works Engineering,* 24 W. 40th St., New York 18, N.Y., (Oct. '37)

**Mann, W. O.,** *see* Siler City, Town of

**Manning, R. E.,** Supt., Williamston Water Dept., Williamston, N.C. (Oct. '43)

**Manock, Foster T.,** 912 Pershing Square Bldg., 448 S. Hill St., Los Angeles 13, Calif. (Nov. '32) *P*

**Mansfield, Myron G.,** Vice-Pres., Morris Knowles, Inc., 1312 Park Bldg., Pittsburgh, Pa. (June '24) *Fuller Award '43. MP*

**Manson, A. B.,** Gen. Mgr., Public Utility Com., Stratford, Ont., Can. (Feb. '30)

**Manwiller, C. K.,** *see* Birdsboro Water Co.

**Mara, Anthony,** Supt. of Public Works, Township of Parsippany Troy Hills, Boonton, R.D., N.J. (Apr. '39)

**Marckmann, O. W.,** Marckmann & Williams, Inc., Box 3085, Seattle 14, Wash. (Apr. '38) *M*

**Marcott, D. G.,** Supt., Water Dept., Columbus, Mont. (Jan. '41) *M*

**Margolis, Elly T.,** Technical Director, The Seven Up Co., 1221 Locust St., St. Louis 12, Mo. (July '42)

**Marinette Water Com.,** Ernest Bowman, Supt., 1444 Main St., Marinette, Wis. (Corp. M. July '43)

**Marks, Henry C.,** Asst. Dir. of Research, Wallace & Tiernan Co., 11 Mill St., Belleville 9, N.J. (Jan. '44) *P*

**Marquardt, Raymond,** Controller, Water Supply Co., 161–20—89th Ave., Jamaica 1, N.Y. (Jan. '44) *A*

**Marquis, J. K.,** Engr. in Charge of Plant, Spartanburg Water Works, R. No. 2, Chesnee, S.C. (July '30) *Director '37–'40.*

**Mars, A. D., Jr.,** Mgr., Neptune Meter Co., Box 5210, Denver 17, Colo. (Dec. '26) *M*

**Marsden, Howard G.,** Mgr. & Treas., Manchester Water Co., Manchester Center, Vt. (Jan. '44) *AM*

**Marsh, Francis B.,** Assoc. Editor, *Water Works Engineering*, 24 W. 40th St., New York 18, N.Y. (May '24) *AMP*

**Marsh, Frederick E.,** Chemist, Council Bluffs Water Works, 520 Oakland Ave., Council Bluffs, Iowa (July '42)

**Marsh, John A.,** Chemist, Baldwin Filtration Plant, 11216 Fairhill Rd., Cleveland 4, Ohio (Apr. '37) *P*

**Marsh, N. P.,** Water Dept., Greenwich, Ohio (Apr. '44) *P*

**Marshall, L. A.,** Supt. of Filtration, Baldwin Filtration Plant, 11216 Fairhill Rd., Cleveland 4, Ohio (May '21) *P*

**Marshall, W. W.,** Town Engr., Orangeville, Ont., Can. (Jan. '44)

**Marson, C. J.,** Vice-Pres. & Mgr., Maryland Water Works Co., 79 E. Main St., Westminster, Md. (Jan. '43)

**Marston, Frank A.,** Cons. Engr., Metcalf & Eddy, Cons. Engrs., 1300 Statler Bldg., Boston 16, Mass. (Feb. '22) *P*

**Martin, Alexander G.,** *see* Tonawanda, Town of

**Martin, E.,** Vice-Pres., Martin & Goold Water Corp., Box 89, El Monte, Calif. (Oct. '40) *A*

**Martin, Frank A.,** Dist. Mgr., Wallace & Tiernan Sales Corp., 615 Laclede Gas Bldg., St. Louis 1, Mo. (Apr. '44) *P*

**Martin, Guy E.,** Supt. of Water Service, Illinois Central R.R., 135 E. 11th Pl., Chicago 5, Ill. (July '44)

**Martin, H. B.,** Supt., Munic. Com., Mohawk, N.Y. (Jan. '38)

**Martin, H. L.,** *see* Gravenhurst Elec. Light & Water Com.

**Martin, J. C.,** Supt. of Water Plant, Tarboro, N.C. (Oct. '42)

**Martin, John J., Jr.,** Supt. of Filter Plant, Route 3, Lebanon, Tenn. (Apr. '44) *P*

**Martin, Michael J.,** Chem. Engr., 395 Collins St., Melbourne C. 1, Australia (Jan. '36)

**Martin, Paul H.,** 1611 Grand View Ave., Columbus 8, Ohio (Oct. '38)

**Martin, Phil J., Jr.,** City Water Supt., Box 2710, Tucson, Ariz. (Mar. '31)

**Martin, Sylvan C.,** Capt., Sn.C., Head, Water Security Section, Security & Intelligence Div., H.N.S.C., Fort Douglas, Utah (Oct. '43) *P* ★

**Martindale, R. H.,** Supt. & Mgr., Elec. Light & Water Works Dept., Drawer 250, Sudbury, Ont., Can. (Jan. '29) *M*

**Martindale, R. W.,** Pacific Coast Mgr., U.S. Pipe & Foundry Co., 907 Monadnock Bldg., San Francisco 5, Calif. (Nov. '23)

**Martinez, Elizardo,** Engr., Calle B 58, Vedado, Havana, Cuba (Jan. '44)

**Martinez, Ernest,** Mgr., Taos Munic. Water Dept., Box 135, Taos, N.M. (Apr. '42) *M*

**Martinez, Rolando A.,** Cons. Engr., San Rafael No. 106, Antes No. 12, Havana, Cuba (Dec. '27)

**Martinez, Sergio S.,** Civ. Engr., Calle H No. 354, Vedado, Havana, Cuba (July '38) *P*

**Martinez-Ponte, J. Raf.,** Civ. & San. Engr., Norte 14 No. 139, Caracas, Venezuela (July '30)

**Marx, Frank,** Supt., Water Dist., Highland, N.Y. (Affil. Jan. '41) *P*

**Marx, George W.,** Director, San. Eng. Div., State Dept. of Health, 408 Arizona State Bldg., Phoenix, Ariz. (Jan. '44) *MP*

**Marysville Water Dept.,** James L. Galloway, Marysville, Mich. (Corp. M. Jan. '41)

**Marzec, Edmund J.,** 3231—4th Ave., Sioux City, Iowa (Jan. '36) ★

**Mason, Arnold C.,** Assoc. Geologist, State Geological Survey, Urbana, Ill. (Apr. '43)

**Mason City Water Dept.,** H. T. Barclay, City Mgr., Mason City, Iowa (Corp. M. Jan. '37)

**Mason, Ernest R.,** Sgt., RCAF, 140 Roslin Ave., Toronto, Ont., Can. (July '43) ★

**Mason, William Caton,** Filtration Engr., Div. of Water Purification, 1623 W. Leland Ave., Chicago, Ill. (July '42)

**Massa, J. B.,** *see* Pampa Water & Sewage Dept.

**Massey, Carlton C.,** County Mgr., Henrico Co., Richmond 7, Va. (Jan. '39)

**Massey Concrete Products Co.,** G. H. Redding, Pres., 122 S. Michigan Ave., Chicago 3, Ill. (Assoc. M. July '43)

**Masters, C. P.,** Supt., Munic. Authority of Boro of Greenville, Greenville, Pa. (Affil. Jan. '41)

**Masterson, W. D.,** *see* San Antonio City Water Board

**Mather, Edward K.,** Cons. Civ. Engr., 309–13 Western Bldg., Mitchell, S.D. (Nov. '29)

**Matheson, D. H.,** 155 London St., S., Hamilton, Ont., Can. (May '34)

**Matheson, Stanley C.,** Supt., Comrs. of Sewers & Water Supply, City Hall, Charlottetown, P.E.I., Can. (Jan. '42)

**Mathews, C. K.,** Chief Engr., Burns & McDonnell Eng. Co., 107 W. Linwood Blvd., Kansas City 2, Mo. (July '44)

**Mathews, Everett R.,** 102 W. Summit, Pierre, S.D. (May '34) ★

**Mathews, F. Rockwell,** Water Supt., Mount Kisco, N.Y. (Jan. '34)

**Mathews, H. M.,** Supt., Water & Light Dept., Thomasville, Ga. (Oct. '39) *MP*

**Mathews, L. R.,** Supt., Three Rivers Filtration Plant, Fort Wayne 2, Ind. (Jan. '35) *MP*

**Mathews, W. W.,** Supt., Gary Sanitary Dist., Box 388, Gary, Ind. (Nov. '25)

**Mathieson Alkali Works, Inc., R. J.** Quinn, 60 E. 42nd St., New York 17, N.Y. (Assoc. M. Mar. '20)

**Matson, George W.,** Pres., Board of County Comrs., Courthouse, Columbus, Ohio (July '43)

**Matte, Hubert P. T.,** Cons. Engr., Worthington-Gamon Meter Co., 296 South St., Newark 5, N.J. (July '13) *M*

**Matter, L. D.,** Dist. Engr., State Dept. of Health, 2536 Lexington St., Harrisburg, Pa. (May '23) *P*

**Mattern, J. D.,** *see* Diamond Alkali Co.

**Matthews, Emory C.,** Secy. & Treas., Board of Water Comrs., City Hall, Macon, Ga. (Jan. '40) *A*

**Matthews, J. C.,** 909 Architects & Builders Bldg., Indianapolis, Ind. (Jan. '38) ★

**Matthews, Richard G.,** Supt., Muskegon Heights Water Dept., City Hall, Muskegon Heights, Mich. (Jan. '43) *AMP*

**Matthews, Roy,** Supt., Water Dept., Albany, Tex. (Jan. '44)

**Matthews, William E., III,** Pres., Alabama Water Service Co., Watts Bldg., Birmingham, Ala. (Jan. '37)

**Mattinson, Frank W.,** Vice-Pres., Skenandoa Rayon Corp., 1201 Broad St., Utica, N.Y. (Jan. '39)

**Mau, Carl F.,** Vice-Pres., California Water Service Co., Box 1150, San Jose, Calif. (Jan. '37) *M*

**Mau, Gordon E.,** 414 E. Prospect St., New Hampton, Iowa (July '43) *AP*

**Mauch, Theo. C. M.,** Supt. of Pumping, Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Dec. '24)

**Maurer, George V.,** Asst. Supt., Water Dept., Freeport, N.Y. (Jan. '43)

**Mavis, Frederic T.,** Head, Civ. Eng. Dept., Carnegie Institute of Technology, Pittsburgh 13, Pa. (Oct. '25) *MP* †

**Maxwell, C. H.,** Supt. of Water, Colton, Calif. (Oct. '37)

**Maxwell, Donald H.,** Cons. Engr., Alvord, Burdick & Howson, 20 N. Wacker Drive, Chicago 6, Ill., (Feb. '17)

**Maxwell, G. E.,** *see* Simcoe Public Utilities Com.

**Maxwell, Wm. A.,** Mgr., Toronto Township Water Works, Cooksville, Ont., Can. (Jan. '39)

**May, Harold L.,** Engr., Water & Sewer Div., City Hall, Palo Alto, Calif. (Jan. '43)

**Mayer, Edward B.,** Asst. Civ. Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '29) *M*

**Mayhan, W. A.,** Supt. of Filtration, Little Rock Munic. Water Works, Robinson Memorial Auditorium, Little Rock, Ark. (Jan. '41) *P*

**Mayhew, H. G.,** Chairman, Water Com., 111 Beckwith St., Smiths Falls, Ont., Can. (Jan. '42)

**Maynard, Stuart B.,** Asst. Engr.—Filter Design, Bureau of Water, 241 Chestnut St. Pier, Philadelphia, Pa. (July '42)

**Mays, Ernest H.,** Supt., Madison Heights Sanitary Dist., Madison Heights, Va. (July '42)

**Mazac, A. Muriel (Miss),** Chemist, Klett Mfg. Co., Chem. Dept., 179 E. 87th St., New York 28, N.Y. (July '43)

**Mazurie, Clarence S.,** Supt., City Utilities Dept., 4901 Landis Ave., Sea Isle City, N.J. (July '43)

**McAdam, S. Allen,** City Engr., 369 N. 9th St., Lebanon, Pa. (Apr. '36) ★

**McAlary, Allan,** Supt. & Treas., Camden & Rockland Water Co., Box 264, Rockland, Me. (Apr. '22) *AM*

**McAlpine, James,** Supt., Water Dept., City Hall, Garfield, N.J. (Jan. '44)

**McAmis, James W.,** Supt. of Water Works, Greeneville, Tenn. (Sept. '21)

**McAndrew, Frank J.,** Mgr., St. Joseph Water Co., 825 Francis St., St. Joseph, Mo. (Jan. '40)

**McArdle, James,** Supt., Water Stores, Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (Oct. '43) *M*

**McArthur, F.,** *see* Etobicoke, Township of

**McAtee, Louis A.,** Constr. Engr., San Francisco Water Dept., 1731—22nd Ave., San Francisco 22, Calif. (Jan. '44)

**McBride, Geo. A.,** 2088 Hawthorne Ave., Grosse Pointe Woods, Detroit 30, Mich. (July '41) ★

**McBride, Samuel P.,** Chemist, Shenango Valley Water Co., Sharon, Pa. (July '39) *P*

**McBrien, Stewart R.,** Supt., Alymer Public Utilities Com., Alymer, Ont., Can. (Jan. '41)

**McCaffrey, Wm. A.,** Supt. of Water Works, City Hall, Oswego, N.Y. (June '20) *Director '38–'41. M*

**McCall, R. G.,** Asst. San. Engr., State Health Dept., 1615 Franklin Ave., Charleston, W.Va. (Affil. Jan. '39) ★

**McCall, R. L.,** Engr., Water Dept., Utilities Bldg., Jacksonville, Fla. (Jan. '40) ★

**McCallion, Joseph,** Asst. Supt., Water Dept., City Hall, Dearborn, Mich. (Apr. '43) *M*

**McCallister, H. M.,** *see* Astoria, City of

**McCallum, Gordon E.,** San. Engr., U.S. Public Health Service, 1223 Flood Bldg., San Francisco 2, Calif. (Oct. '43) ★

**McCambridge, J. H.,** *see* Burbank Public Service Dept.

**McCann, Charles,** Supt., City Water Dept., Egg Harbor City, N.J. (July '43)

**McCann, Gilbert D.,** Engr., Maywood Mutual Water Co., No. 3, 6155 Heliotrope Ave., Maywood, Calif. (Oct. '39)

**McCann, Harry,** Div. Supt. of Operations, Montana Power Co., Missoula, Mont. (Apr. '43)

**McCarthy, Daniel V.,** Prin. Engr., War Production Board, 4417 Dittmar Rd., Arlington, Va. (Nov. '43)

**McCarthy, Frank J.,** Water Supt., 322 Hume St., Allenhurst, N.J. (July '43)

**McCarthy, Gerald T.,** Engr.-Mgr., Cons. Engrs., C.A., Apdo. 168, Caracas, Venezuela, S.A. (Apr. '42)

**McCarthy, J. Fred,** *see* McCarthy Well Co.

**McCarthy, J. J.,** Chemist, Racine Water Dept., City Hall, Racine, Wis. (July '37)

**McCarthy, Owen A.,** Supt. of Water Supply, Michigan & Schaefer Rd., Dearborn, Mich. (Mar. '27) *AM*

**McCarthy Well Co.,** J. Fred McCarthy, 670 Eustis St., St. Paul 4, Minn. (Assoc. M. Oct. '41)

**McCaslin, Walter R.,** Cons. Engr., McCaslin & Co., Nokomis, Ill. (July '42)

**McClane, J. Huston,** Hercules Powder Co., Inc., Kalamazoo, Mich. (Oct. '37) ★

**McClara, W. H.,** *see* Consolidated Steel Corp., Ltd.

**McClarty, J. C.,** Supt., City Water Dept., Cabot, Ark. (Apr. '43)

**McCleary, W. F.,** Foreman, Metropolitan Water Dist., Box 42, Arlington, Calif. (Oct. '43)

**McClees, Joseph H.,** Water Meter Repair, Bureau of Water Works & Supply, 468 Ducommun St., Los Angeles 12, Calif. (July '38) *M*

**McClelland, Henry T.,** Mgr., Waynesburg Water Co., Waynesburg, Pa. (June '30)

**McClenahan, W. T.,** Prin. Constr. Engr., Sanitary Dist. of Chicago, 6218 University Ave., Chicago 37, Ill. (Apr. '14)

**McClintock, H. C.,** *see* Boulder Water Dept.

**McCloskey, Joseph A.,** Supt., Pacific Marine Utility Co., 466—27th St., San Francisco 14, Calif. (Jan. '44) *P*

**McClung, Laurence E.,** Prin. Eng. Aide, Dalecarlia Filtration Plant, 5900 MacArthur Blvd., N.W., Washington 16, D.C. (July '43) *P*

**McComb, George B.,** *see* Barrett Div.

**McConnell, J. D.,** *see* Proximity Mfg. Co.

**McCoombs, John A.,** Supt. of Water Works & Public Works, 100 Main St., South, Kenora, Ont., Can. (Apr. '44) *P*

**McCord, C. M.,** *see* Memphis Light, Gas & Water Div.

**McCoy, J. W.,** Supt. of Filtration, Munic. Light & Water Plant, Madisonville, Ky. (Jan. '40)

**McCoy, Ted,** *see* Brazil City Water Works

**McCrady, MacHarvey,** Chief of Labs., Quebec Ministry of Health, 89 Notre Dame, E., Montreal, Que., Can. (Apr. '16) *P*

**McCreery, T. W.,** Asst. Southern Sales Mgr., U.S. Pipe & Foundry Co., 1711 First National Bldg., Birmingham 3, Ala. (Jan. '36)

**McCrory, T. G.,** Supt. of Water Dept., City Hall, Anacortes, Wash. (Apr. '44) *M*

**McCune, Adrian,** Member of Board, Dept. of Water & Sewers, 1810 Brickell Ave., Miami, Fla. (Apr. '42)

**McCune, Leo W.,** Attorney, East Jefferson Water Works Dist. No. 1, 117 H. P. Long Ave., Gretna, La. (Jan. '44)

**McDaniel, B. J.,** City Mgr., City Hall, Big Spring, Tex. (July '38)

**McDiarmid, David M.,** 54 Clermiston Rd., Edinburgh 12, Scotland (July '38)

**McDivitt, Wm. A.,** Pres., Freeport Water Co., 331—4th St., Freeport, Pa. (July '39)

**McDonald, A. Y., Mfg. Co.,** H. A. Talley, Mgr., Plumbing Brass Div., Box 508, Dubuque, Iowa (Assoc. M. Jan. '40)

**McDonald, Lewis,** Asst. to Exec. Vice-Pres., Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill. (Apr. '44)

**McDonald, Norman G.,** Gore & Storrie, Cons. Engrs., 1130 Bay St., Toronto 5, Ont., Can. (Jan. '35)

**McDonnell, Robert E.,** Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City 2, Mo. (May '13)

**McDonough, Frank J.,** Asst. Mech. Engr., City of Chicago, 811 N. Michigan Ave., Chicago 11, Ill. (Oct. '41) *M*

**McDonough, George,** Secy., North Jersey Dist. Water Supply Com., Wanaque, N.J. (Apr. '44)

**McDowell, Francis B., Jr.,** Asst. Mgr. & Engr., Comrs. of Public Works, Box 829, Charleston, S.C. (June '29) *M*

**McEldowney, L. E.,** Chemist, Water Dept., Tampa, Fla. (Jan. '41) ★

**McElhiney, Wm. A.,** *see* Miller, J. P., Artesian Well Co.

**McFadden, William,** Supt., Water Operations, Seattle Water Dept., Airport Way & McClellan St., Seattle, Wash. (Apr. '43) *M*

**McFarland, John T.,** Dist. Mgr., Calgon, Inc. & Hall Labs., Inc., 1208 Continental Bldg., 3615 Olive St., St. Louis 8, Mo. (July '44)

**McFarland, Kenneth E.,** City Engr., Box 831, Midland, Tex. (Jan. '43) *M*

**McFaul, W. L.,** City Engr. & Mgr. of Water Dept., City Hall, Hamilton, Ont., Can. (Mar. '24) *Director '43–'46.*

**McGahan, Claude R.,** Water Plant Operator, City Bldg., El Dorado, Kan. (July '44)

**McGauhey, P. H.,** Prof. of San. Eng., Virginia Polytechnic Institute, Blacksburg, Va. (July '38)

**McGeehin, D. J.,** Supt., Hazleton City Authority, Water Dept., 38 S. Church St., Hazleton, Pa. (July '35)

**McGhee, D. W.,** Mgr., Pasco Water Dept., Pasco, Wash. (Jan. '35)

**McGinnis, C. A.,** *see* Johns-Manville Sales Corp.

**McGinnis, C. E.,** *see* New Mexico Public Service Com.

**McGonigale, Wm. J.,** Treas., Interstate Water Co., 203 N. Jackson St., Louisville 2, Ky. (Apr. '12)

**McGowan, Hugh, Jr.,** Supt., Pumping Station, 15 McLean St., Freehold, N.J. (Jan. '38)

**McGowan, John,** 433 Gilpin St., Denver 3, Colo. (Jan. '41) *M*

**McGrann, John Howard,** Draftsman, Chicago Bridge & Iron Co., Y.M.C.A. Box 704, Birmingham, Ala. (Jan. '41) ★

**McGrath, Louise E. (Miss),** Vice-Pres., Booth Chemical Co., Box 203, Elizabeth, N.J. (July '39)

**McGrath, Robert Louis,** Asst. Regional Engr., Water Div., War Production Board, 1355 Market St., San Francisco 3, Calif. (Apr. '43)

**McGuire, J. M.,** Gen. Mgr., Associated Chemical Co. of Canada, Ltd., 14 Darrell Ave., Toronto 13, Ont., Can. (Jan. '44) *P*

**McGuire, M. H.,** *see* McMinnville Water & Light Dept.

**McGuire, Orla E.,** Asst. San. Engr., Bureau of Eng., State Dept. of Health, Lansing 4, Mich. (Jan. '39) *P* ★

**McGuire, Thomas M.,** Mgr. of Water Dept., Plymouth, Wis. (Jan. '40) *M*

**McGurk, Samuel R.,** 2206 N. Tenth St., Terre Haute, Ind. (Jr. M. Oct. '41) ★

**McHugh, Arthur C.,** 76 Burhans Pl., Delmar, N.Y. (Jan. '44) *A*

**McHugh, Charles A.,** Water Works Contractor, 892 N. Markoe St., Philadelphia 39, Pa. (Jan. '44)

**McIntosh, A. K.,** Mgr., Public Utilities Com., 207 Division St., Cobourg, Ont., Can. (Jan. '41)

**McIntyre, F. J.,** Director, Columbus Water & Chemical Testing Lab., 58 Olentangy St., Columbus 2, Ohio (July '39) *P*

**McIntyre, H. A.,** Water Supply Engr., Dept. of Transport, Civ. Aviation Branch, 284 Hunter Bldg., Ottawa, Ont., Can. (Jan. '41) *P*

**McIntyre, P. T.,** Jr. Engr., Los Angeles Dept. of Water & Power, 315 N. Adams St., Glendale 6, Calif. (Oct. '34) *M*

**McKanghan, O. M.,** *see* Wake Forest, Town of

**McKay, George, Jr.,** Pres., The Leadite Co., Inc., Girard Trust Company Bldg., Philadelphia 2, Pa. (Apr. '30)

**McKay, R. Donald,** San. Engr., Dept. of Public Health, Halifax, N.S., Can. (Jan. '41) *P*

**McKay, W. G.,** Dist. Engr., Dept. of Pensions & National Health, Strathcona Public Bldg., Box 4140, Edmonton, Alta., Can. (Jan. '42) *P*

**McKay, W. M.,** Johns-Manville Sales Corp., 116 New Montgomery St., San Francisco 5, Calif. (Jan. '38)

**McKee, Frank J.,** 501 Manor Ridge Drive, N.W., Atlanta, Ga. (Jan. '44) *P* ★

**McKee, J. E.,** 17 College Ave., Waterville, Me. (Jan. '43) ★

**McKee, James,** Asst. Supt., Palisades del Rey Water Co., 427 Moscow St., Playa del Rey, Calif. (July '42)

**McKee, Wm.,** *see* St. Marys Public Utilities Com.

**McKeen, William H.,** Assoc. San. Engr., c/o Post Engr., Camp San Luis Obispo, Calif. (Oct. '43) *P*

**McKersie, Allen E.,** Water Comr., 1297 Holly Drive, Colton, Calif. (Oct. '42)

**McKinstry, Edward N.,** Assoc. Public Health Engr., U.S. Public Health Service, Kitsap County Health Dept., 2813 Farragut St., Bremerton, Wash. (July '40) ★

**McLaughlin, H. L.,** Salesman, Pittsburgh Equitable Meter Co., 1310 Race St., Denver 6, Colo. (Mar. '26)

**McLaughlin, Martin J.,** Chief Engr., Dept. of Public Works, Water Bureau, 801 City Hall Annex, Philadelphia 7, Pa. (Apr. '42) *M*

**McLaughlin, Philip L.,** San. Engr., West Virginia Water Service Co., 814 Peoples Bank Bldg., Charleston, W.Va. (July '28) ★

**McLaughlin, Richard R.,** *see* Westchester Co. Dept. of Health

**McLean, R. F.,** Supt. of Water Dept., Walla Walla, Wash. (June '28)

**McLean, W. A.,** *see* Alexandria Water Dept.

**McLean, W. A.,** Cons. Engr., Liverpool Rd., Pickering, Ont., Can. (July '35)

**McLellan, J. B.,** Asst. San. Engr., State Board of Health, 620 S. Third St., Louisville, Ky. (July '42) ★

**McLemore, Opal,** Filter Plant Operator, State Tuberculosis Sanitorium, Boonville, Ark. (Apr. '43)

**McLure, J. H.,** City Engr., Chester, S.C. (Apr. '38) *P*

**McManamna, Theodore L.,** 373 Wartley Rd., London, Ont., Can. (Jan. '34)

**McMillan, L. S.,** Supt., Water Works, Raeford, N.C. (July '35) *P*

**McMinn, M. E.,** 508 W. McKay St., Carlsbad, N.M. (Oct. '42)

**McMinnville Water & Light Dept.,** M. H. McGuire, Mgr., McMinnville, Ore. (Corp. M. July '34) *Director '38–'41. Fuller Award '42.*

**McMorrow, Bernard J.,** Box 3841, Honolulu 1, T.H. (Jan. '38)

**McMullen, R. S.,** Pres., 409 First National Bank Bldg., Carbondale, Pa. (July '35)

**McMurray, F. R.,** *see* Skinner, M.B., Co.

**McMurry, W. F.,** 405 City Hall, Tulsa, Okla. (Apr. '36)

**McNally, Christopher J.,** Gen. Mgr., Cement Gun Co., Inc., 1520 Walnut St., Allentown, Pa. (Apr. '43)

**McNamara, Leo G.,** Salesman & Chemist, Layne-New York Co., Inc., 400 Highland Terrace, Orange, N.J. (July '39)

**McNamee, Robert L.,** Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, Mich. (June '26)

**McNeice, L. G.,** *see* Orillia Water, Light & Power Com.

**McNeill, Johnnie L.,** Supt., Light & Water Dept., Lumberton, N.C. (Aug. '26) *M*

**McPeak, Douglas H.,** Water Treatment Engr., Fuel Economy Engineering Co., 508 New York Bldg., St. Paul 1, Minn. (Apr. '42) *P* ★

**McPhail, Alex. L.,** Supt., Water Works Com., St. Catharines, Ont., Can. (Jan. '35) *MP*

**McPherson, C. E.,** Water Com. Supt., Water Dept., City Hall, Little Falls, Minn. (July '39) *P*

**McQueen, Leo E.,** Supt., Board of Public Works, Coldwater, Mich. (Apr. '23) *M*

**McQuilkin, Frank R.,** 108 Clarion Rd., Oak Ridge, Tenn. (Jan. '42) *P*†

**McRae, J. P.,** McRae Engineering Equipment, Ltd., 11 King St., W., Toronto 2, Ont., Can. (Jan. '24)

**McWane Cast Iron Pipe Co.,** W. P. Cox, Gen. Sales Mgr., Box 2601, Birmingham 2, Ala. (Assoc. M. Apr. '23)

**McWilliams, D. E.,** Mgr., Roaring Creek Water Co., Box 17, Shamokin, Pa. (Mar. '22)

**McWilliams, John S.,** Pres., Roaring Creek Water Co., 204 E. Sunbury St., Shamokin, Pa. (Apr. '43) *M*

**Mead Corp., The,** Harold T. Ruff, Developmental Chem. Engr., Chillicothe, Ohio (Corp. M. Jan. '43)

**Mead, Daniel W.,** Civ. Engr., 120 W. Gorham St., Madison 3, Wis. (Apr. '89) *Honorary M. '30.*

**Mead, Robert W.,** City Mgr., City Hall, Box 391, Redwood City, Calif. (Jan. '43) *M*

**Meadows, J. O.,** San. Engr., J. T. Donald & Co., Ltd., 1181 Guy St., Montreal, Que., Can. (June '20) *P*

**Meara, John W.,** Comr. of Public Works, 16 James St., Middletown, N.Y. (July '42)

**Medbery, Hiram Christopher,** Chief Water Purif. Engr., San Francisco Water Dept., Millbrae, Calif. (Oct. '37) *P*

**Medford Water Com.,** Robert A. Duff, Supt., City Hall, Medford, Ore. (Corp. M. Mar. '30)

**Medlar, George E.,** Engr., Office & Water Div., Windsor Utilities Com., 607 Canada Bldg., Windsor, Ont., Can. (Apr. '43)

**Medlen, Jay,** City Comr. No. 2, Water Dept., Fort Smith, Ark. (July '43)

**Meehan, Austin,** John Meehan & Son, Water Pipe Constr., 916 W. Dakota St., Philadelphia 33, Pa. (Apr. '44) *M*

**Meeker, W. L.,** Supt., Water Works Co., Clinton, Iowa (Oct. '28)

**Mees, Curtis A.,** Cons. Engr., 121—17th St., N.E., Atlanta, Ga. (Jan. '43)

**Meinzer, Oscar E.,** Chief, Ground Water Div., U.S. Geological Survey, Washington 25, D.C. (July '42) *MP*

**Meissner, Wm. A., Jr.,** 4207 Russell Ave., Mt. Rainier, Md. (July '38) *M* ★

**Mejia, Hernando,** San. Engr., Apdo. No. 413, Bogota, Colombia, S.A. (July '42)

**Melbo, Irene Marion (Miss),** Lab. Asst., Water Dept. Lab., City Hall, Bellingham, Wash. (Jr. M. Apr. '41)

**Melbourne & Metropolitan Board of Works,** F. M. Lee, Engr. of Water Supply, 110 Spencer St., Melbourne C. 1, Victoria, Australia (Corp. M. Jan. '36)

**Melcher, Frank W.,** Bottlers' Service Dept., The Coca-Cola Co., 310 North Ave., N.W., Atlanta 1, Ga. (Oct. '43)

**Mellen, Arthur F.,** Supt. of Filtration, Columbia Heights Filtration Plant, Minneapolis 13, Minn. (Mar. '15) *Fuller Award '43. MP*

**Melley, William P.,** Supt., Milton Water Dept., 49 Plymouth Ave., Milton 86, Mass. (Jan. '41) *M*

**Mellon, T. A.,** Pres., Kensington Water Co., 210 E. Park Way, N.S., Pittsburgh 12, Pa. (June '03)

**Melvin, Howard H.,** Gen. Mgr., Millville Water Co., 209–11 High St., Millville, N.J. (Jan. '39)

**Memphis Light, Gas & Water Div.,** C. M. McCord, Director, Water Div., Box 388, Memphis, Tenn. (Corp. M. Apr. '09) *Fuller Award '43.*

**Mendelsohn, Isador W.,** Engr.-Resident, Columbus General Depot, Columbus, Ohio (Feb. '20) ★

**Meng, B. B.,** Supt. of Water Works, Winnsboro, S.C. (Apr. '29)

**Menzenhauer, Fred C.,** 65 Maple Ave., Hackensack, N.J. (Jan. '38)

**Menzies, D. B.,** Provincial San. Engr., 218 Administration Bldgs., Edmonton, Alta., Can. (Jan. '37)

**Mercer, B. F.,** Water Comr., City Water Dept., Sidney, Mont. (Oct. '42)

**Mercer, Keith,** Mgr., Paterson Engineering Co. of Canada, Ltd., 1100 Craig St., E., Montreal, Que., Can. (Oct. '42)

**Merckel, F. G.,** Wallace & Tiernan Co., Inc., Box 178, Newark 1, N.J. (Jan. '21) *P*

**Meredith, E. C.,** Asst. San. Engr., State Dept. of Health, 119 State Office Bldg., Richmond, Va. (Jan. '37) ★

**Merfeld, F. A.,** *see* Citizens Utilities Co.

**Merkel, Paul P.,** Anal. Chemist, 1707 Olive St., Reading, Pa. (Jan. '37) *P*

**Merrick, Clyde R.,** Water Supply Engr., 4626 Carson Ave., Indianapolis 44, Ind. (Jan. '37)

**Merrill, Arthur J.,** *see* Johnson City Water Dept.

**Merrill, Neal P.,** Supt. of Water Works, Algonac, Mich. (Apr. '43) *P*

**Merrithew, William S.,** Asst. Engr., Metropolitan Water Dist., 306 W. 3rd St., Los Angeles, Calif. (Oct. '43)

**Merritton Public Utilities Com.,** Elizabeth V. Clark, Secy.-Treas., Water Works Dept., Town Hall, Merritton, Ont., Can. (Corp. M. June '26)

**Merryfield, Fred,** Assoc. Prof., Civ. Eng., Oregon State College, Corvallis, Ore. (May '34) *Fuller Award '44. P*

**Merz, H. S.,** Supt. of Water Dept., 3227 Westgate Parkway, Rockford, Ill. (Oct. '37) *AM*

**Messer, Richard,** San. Engr., State Dept. of Health, 708 State Office Bldg., Richmond 19, Va. (Sept. '11) *Director '43–'46. P*

**Metcalf, Frank,** Supt., California-Michigan Land & Water Co., 3751 Mountain View Ave., Pasadena 8, Calif. (Oct. '43) *M*

**Mexico, Banco Nacional Hipotecario Urbano y de Obras Publicas, S.A.,** Jose Mendez Valazquez, Ave. Fco. I Madero No. 32, Mexico, D.F., Mexico (Corp. M. Oct. '37)

**Meyer, B. H.,** Water Comr., Munic. Water Works, West Salem, Wis. (July '44)

**Meyer, Ed,** Water Works Supt., Hespeler, Ont., Can. (Apr. '32) *M*

**Meyer, Ernest L. H.,** *see* Glens Falls Board of Water Comrs.

**Meyer, H. R. J.,** 4545 Alice Ave., St. Louis 15, Mo. (Jan. '35)

**Meyer, Hazen I.,** Sr. Civ. Eng. Draftsman, Dept. of Water Supply, 17350 Cooley St., Detroit 19, Mich. (Affil. July '40)

**Meyer, J. Edward,** *see* Newtown, Citizens Water Supply Co. of

**Meyer, Norcliffe S.,** 2nd Lt., Sn.C., Station Hospital, Camp Callan, San Diego 14, Calif. (Jan. '44) ★

**Meyerherm, Charles F.,** Pres. & Engr., Albert F. Ganz, Inc., 511—5th Ave., New York 17, N.Y. (Jan. '22) *M*

**Meyers, E. W., Jr.,** Controller, Pittsburgh Equitable Meter Co., 400 Lexington Ave., Pittsburgh 8, Pa. (Jan. 44)

**Miami Dept. of Water & Sewers,** W. A. Glass, Director, Box 4821, Miami 31, Fla. (Corp. M. Apr. '40)

**Michael, A. C.,** Sr. Assoc. Mech. Engr., 804 Water Board Bldg., Detroit 26, Mich. (Jan. '38) *M*

**Michael, A. M.,** Supt., Water Dept., Mebane, N.C. (Aug. '26)

**Middleton, Francis M.,** Asst. Chemist, U.S. Public Health Service, E. Third & Kilgour Sts., Cincinnati 2, Ohio (Jan. '43) *P*

**Middleton, W. G.,** Supt., Munic. Public Service Com., Yazoo City, Miss. (Apr. '29)

**Middletown Water Dept.,** Samuel C. Cannon, Supt., Middletown, Conn. (Corp. M. June '21)

**Midland Public Utilities Com.,** Roy S. King, Box 548, Midland, Ont., Can. (Corp. M. Mar. '27)

**Midland Water Dept.,** Midland, Mich. (Corp. M. Jan. '40)

**Miguel, Agustin Otero,** Engr., Havana WaterWorks, Estacion Bombas Palatino, Cerro, Havana, Cuba (Jan. '40)

**Mikesell, C. C.,** Field Repr., Johns-Manville Corp., 816 W. 5th St., Los Angeles 13, Calif. (Oct. '39)

**Miles, Harry B.,** Gen. Mgr., Board of Water Supply, 712 Washington St., Utica 2, N.Y. (June '24) *M*

**Miles, Henry J.,** Assoc. Prof. of Civ. Eng., College of Eng., Univ. of Southern California, Los Angeles 7, Calif. (July '41) *P*

**Milford, Carl G.,** Supt., Water Works, 70 S. 2nd St., Rittman, Ohio (Jan. '44) *M*

**Milford, T. H.,** Chief Engr. & Director, Bureau of Sanitation, State Health Dept., Montgomery 4, Ala. (Apr. '38) *P*

**Milford Water Co.,** M. H. Goff, Supt., 226 Main St., Milford, Mass. (Corp. M. July '35)

**Milford Water Dept.,** Walter O. Pimm, Supt., Box 177, Milford, N.J. (Corp. M. July '43)

**Millar, Robert S.,** Mgr., Wichita Water Co., Box 1442, Wichita 1, Kan. (May '38) *M*

**Millensifer, Robert W.,** Repr., Johns-Manville Sales Corp., 2300—5th Ave., N., Great Falls, Mont. (Jan. '42)

**Miller, Alden W.,** Sales Engr., 1833 N. 13th Ave., Phoenix, Ariz. (Oct. '34) *MP*

**Miller, Arthur P.,** Sr. San. Engr., U.S. Public Health Service Dist. No. 1, Sub-Treasury Bldg., 15 Pine St., New York 5, N.Y. (Sept. '20)

**Miller, Charles R.,** Supt., Water & Elec. Dept., Village Hall, Winnetka, Ill. (Oct. '41) *M*

**Miller, Chester A.,** 268 N. 5th Ave., Canton, Ill. (Oct. '41) *MP*

**Miller, Dean A.,** Mgr., Birmingham Office, Chicago Bridge & Iron Co., Box 277, Birmingham 1, Ala. (Apr. '44) *M*

**Miller, Frank H.,** Asst. Engr., Bureau of San. Eng., State Dept. of Health, Richmond, Va. (Apr. '42) ★

**Miller, Glenn W.,** Supt. of Public Works, Gouverneur, N.Y. (Apr. '44) *MP*

**Miller, H. I.,** Partner, Pacific Water Works Supply Co., 2900—1st Ave., S., Seattle 4, Wash. (Jan. '28) *A*

**Miller, J. P., Artesian Well Co.,** Wm. A. McElhiney, Pres., 8226 Ogden Ave., Box 359, Brookfield, Ill. (Assoc. M. Apr. '44)

**Miller, John,** Supt., Water Dept., 408 N. Lake St., Port Washington, Wis. (Apr. '44)

**Miller, John B.,** Director & Chief San. Engr., Bureau of San. Eng., State Board of Health, Box 210, Jacksonville 1, Fla. (July '42)

**Miller, John E.,** Service Engr., Buildings & Constr. Div., State Administrative Board, 115-A State Office Bldg., Lansing 13, Mich. (Apr. '42) *MP*

**Miller, Lavern A.,** Chief Engr., Miller Engineering Service, 719 E. Main St., Streator, Ill. (Jan. '42)

**Miller, Lewis B.,** *see* Technical Assn. Pulp & Paper Industry

**Miller, Louis L.,** Engr., Somerville Water Co., Raritan, N.J. (Jan. '40)

**Miller, Maurice L.,** Cons. San. Engr., 408 McDowell Bldg., Louisville 2, Ky. (Jan. '42)

**Miller, Merle J.,** Supt., Light & Water Dept., East Maple St., Bryan, Ohio (July '35)

**Miller, Paul E.,** Water Chemist, Harmon Color Works, Inc., 550 Belmont Ave., Haledon, N.J. (Jan. '39)

**Miller, R. W.,** *see* Columbia Chemical Div.

**Miller, Rube L.,** Northwest Repr., Worthington-Gamon Meter Co., R.R. 2, Box 105, Bothell, Wash. (Apr. '44)

**Miller, Russell,** Supt., Water & Light Plant, Amory, Miss. (Apr. '30)

**Miller, S. J.,** Water Engr., Public Service Co. of Indiana, Inc., 503 Traction Terminal Bldg., Indianapolis 9, Ind. (Jan. '37) *M*

**Miller, Wallace T.,** *see* Ossining Board of Water Comrs.

**Miller, Warren C.,** City Engr., City Hall, St. Thomas, Ont., Can. (Feb. '23)

**Milligan, T. Edwin,** Complaint Investigator, Fort Wayne Water Works, 1518 E. Lewis, Fort Wayne 4, Ind. (Jan. '41)

**Milliken, W. W.,** *see* Santa Monica, City of

**Millikin, William H.,** City Supt., Denver Munic. Water Works, Box 629, Denver 1, Colo. (Apr. '40) *M*

**Milliren, M. E.,** *see* Du Bois Bureau of Water

**Mills, Blanchard H.,** Water Treatment Plant Operator, Board of Water & Light Comrs., 1104 Bensch St., Lansing, Mich. (Oct. '43)

**Mills, Eugene C.,** Priority & Order Specialist, War Production Board, 2925 Ashley Ave., Berkeley 5, Calif. (Jan. '43) *M*

**Mills, G. F.,** *see* Chemical Process Co.

**Mills, G. H.,** Supt., Water Dist. No. 42, 11711—15th Ave., N.E., Seattle, Wash. (Jan. '42)

**Mills, George A.,** *see* Central Power & Light Co.

**Mills, Henry J.,** Engr., Metropolitan Water Dist., 1615 E. Mountain St., Pasadena 7, Calif. (Oct. '43)

**Mills, M. R., Jr.,** 210 E. Franklin St., Richmond 19, Va. (Oct. '43) *P*

**Mills, Ralph T.,** Supt. of Water Dept., Southern Pines, N.C. (Oct. '30)

**Mills, W. Stuart,** Salesman, Peacock Bros., Ltd., 510 Federal Bldg., Richmond St., W., Toronto, Ont., Can. (July '39)

**Milne, John,** Sales Mgr.—Utilities, Mueller, Ltd., Sarnia, Ont., Can. (Apr. '43) *M*

**Mimico Public Utilities Com.,** Oscar Lawson, Supt. of Water Works Dept., 249 Church St., Mimico, Toronto 14, Ont., Can. (Corp. M. Jan. '41)

**Mimms, Hinton H.,** Maint. Man, Water Works & Sewage Plant, W. Broward at W. Dixie Highway, Fort Lauderdale, Fla. (July '43) *P*

**Mineola, Inc. Village of,** Water Dept., Christian E. Dick, 217 Horton Highway, Mineola, N.Y. (Corp. M. Jan. '41)

**Mineral Wells City Water Works,** T. A. Camp, Water Comr., Mineral Wells, Tex. (Corp. M. Apr. '40)

**Minersville, Munic. Authority of Borough of,** Carl I. Kear, Gen. Mgr., Delaware Ave. & Carbon St., Minersville, Pa. (Corp. M. Jan. '42)

**Minkus, Alexander J.,** 30 N. Whitney St., Hartford 5, Conn. (Oct. '37) *MP*

**Minneapolis Com. of Water Works,** Harry P. Burgum, Chairman, Minneapolis, Minn. (Corp. M. June '20)

**Minor, Edward Eastman,** Vice-Pres. & Gen. Mgr., New Haven Water Co., New Haven 6, Conn. (May '12) *AMP*

**Minor, Lynn O.,** Treas. & Mgr., Kankakee Water Co., 132 S. Dearborn Ave., Kankakee, Ill. (Jan. '22) *M*

**Mira, Armando Fernandez,** Civ. Engr., Jesus Maria No. 278, Havana, Cuba (July '43)

**Mishawaka City Water & Elec. Plant,** Austin R. Klein, Supt., City Hall, Mishawaka, Ind. (Corp. M. Dec. '37)

**Mississippi Lime Co.,** C. C. Schmoeller, Vice-Pres., Alton, Ill. (Assoc. M. Oct. '39)

**Mitchell, Charles F., Jr.,** Asst. Station Operator, 703 Main St., Aurora, Ill. (Oct. '42) *M*

**Mitchell, Earl T.,** Supt. of Filtration, Paducah Water Works, Paducah, Ky. (July '40) *P*

**Mitchell, Louis,** Dean, College of Applied Science, Syracuse Univ., Syracuse 10, N.Y. (Mar. '32) *M*

**Mitchell, R. T.,** *see* Pollard, Joseph G., Co., Inc.

**Mitchell, Robert D.,** Major, Sn.C., A.U.S., 114 S. Spring St., Falls Church, Va. (July '44) ★

**Mitchell, William,** Chief Engr. & Chemist, Northern Illinois Water Corp., 608 W. Grant St., Streator, Ill. (Jan. '42)

**Mitchell, William H.,** Dist. Sales Mgr., The Permutit Co., 407 S. Dearborn St., Chicago 5, Ill. (Jan. '35) *P*

**Moat, Charles P.,** Chemist, State Board of Health, 2 Colchester Ave., Burlington, Vt. (Jan. '15) *P*

**Mobile Water Works Dept.,** E. M. Stickney, Supt., City Hall, Mobile 5, Ala. (Corp. M. Apr. '42)

**Moerk, Frank M.,** Cons. Chem. Engr., 4729 N. 15th St., Philadelphia 41, Pa. (July '40) *P*

**Moffat, A. G.,** Secy., Sewerage & Water Board, 526 Carondelet St., New Orleans 12, La. (July '37)

**Moffat, H. A.,** Industrial Chemical Sales Div., 14827 E. Jefferson Ave., Detroit, Mich. (Apr. '38)

**Moggio, William A.,** 1004 Carolina Ave., Durham, N.C. (Jan. '40) ★

**Mohlman, Floyd W.,** Chief Chemist, Sanitary Dist. of Chicago, 910 S. Michigan Ave., Chicago, Ill. (Oct. '21)

**Moir, Donald,** Montevideo Water Works Co., Ltd., 20–24, Moorgate, London, E.C. 2, England (June '24)

**Molina, Eduardo,** Engr., Oklahoma 25, Col. Napoles, Mexico City, Mexico (Jan. '37)

**Molina, Teofilo Gonzalez,** Civ. Engr., Norte 29, No. 3, Sabana Grande, Caracas, Venezuela, S.A. (Apr. '43)

**Moline Water Works,** A. E. Anderson, Supt., City Hall, Moline, Ill. (Corp. M. Jan. '16)

**Molis, Walter W.,** Supt. of Distr., City Water Works, 127 E. Third St., Muscatine, Iowa (July '35) *M*

**Monro, Albert,** Supt., Pipe Constr., Los Angeles Dept. of Water & Power, 141 N. Meyler St., San Pedro, Calif. (Oct. '30) *M*

**Monroe, City of,** W. H. Crow, Supt. of Water & Light, Monroe, N.C. (Corp. M. Oct. '42)

**Monroe, Owen,** Vice-Pres. & Treas., Heldt-Monroe Co., 201 N. Main St., Evansville 7, Ind. (Oct. '42)

**Monsanto Chemical Co.,** I. J. Stanley Jr., 1700 S. Second St., St. Louis 4, Mo. (Assoc. M. Apr. '37)

**Monsell, Harry M.,** *see* Greenport Water Dept.

**Montgomery, J. H.,** Mgr., Water Works, North Little Rock, Ark. (Oct. '38)

**Montgomery, James M.,** Cons. Engr., J. M. Montgomery & Co., Engrs., 306 W. 3rd St., Los Angeles 13, Calif. (June '27) *P*

**Montgomery, John Gilmour,** San. Engr.—Post Engr., De Ridder Army Air Base, Box 388, De Ridder, La. (Oct. '43) *M*

**Montgomery, Julian,** Cons. Engr., 606 Littlefield Bldg., Austin, Tex. (Jan. '43)

**Montoulieu, Henry J.,** Civ. Engr., Calle B, No. 508, Entre 21 y 23, Vedado, Havana, Cuba (Nov. '11) *P*

**Montpelier Water Dept.,** William F. Corry, Mayor, City Hall, Montpelier, Vt. (Corp. M. Jan. '43)

**Moody, William H.,** Secy. & Gen. Mgr., Naugatuck Water Co., 250 Meadow St., Naugatuck, Conn. (Jan. '41) *M*

**Moomau, J. C.,** Supt., Northern Illinois Water Corp., 124 W. 3rd St., Sterling, Ill. (Apr. '41) *M*

**Moon, C. D.,** *see* New Jersey Water Co.

**Moon, James N.,** Water & Sewer Supt., Borough of Media Water Dept., Borough Hall, Media, Pa. (Jan. '43) *MP*

**Moon, Philip G. G.,** Resident Director, Bournemouth Gas & Water Co., 136 Old Christchurch Rd., Bournemouth, England (Oct. '32)

**Moore, C. C.,** Mgr., Crane Co., Box 751, Great Falls, Mont. (Jan. '41)

**Moore, Carl C.,** Dist. Mgr., Pittsburgh Equitable Meter Co., 311 Bonna Allen Bldg., Atlanta 3, Ga. (Apr. '39)

**Moore, Charles E.,** Mgr., City Water Dept., 311 Avenham Ave., Roanoke 14, Va. (Oct. '23)

**Moore, Edward W.,** Assoc. Prof. of San. Chem., Harvard Graduate School of Eng., 7A Pierce Hall, Harvard Univ., Cambridge 38, Mass. (Oct. '38) ★

**Moore, G. W.,** State Dept. of Health, Terminal Bldg., Rochester 4, N.Y. (Apr. '37) *P*

**Moore, George S.,** Supt. of Water & Light, Albemarle, N.C. (Apr. '24)

**Moore, Herbert,** Engr., 1742 N. Prospect Ave., Milwaukee 2, Wis. (July '28) *P* ★

**Moore, Joseph E.,** Supt., Water Dept., Burlington, Vt. (July '44) *M*

**Moore, Lee S.,** Sanitarian, State Health Dept., Dist. No. 3, 150 E. Spring St., New Albany, Ind. (Apr. '44) *P*

**Moore, M. B.,** Supt., Woodlawn Water Co., Aliquippa, Pa. (July '39)

**Moore, Maynard F.,** Supt., Zionsville Water Works, Zionsville, Ind. (Apr. '42) *M*

**Moore, Russell B.,** Cons. Engr., 1456 N. Delaware St., Indianapolis 2, Ind. (Jan. '28)

**Moore, Thomas F.,** Mgr., General Chemical Co., Box 59, River Rouge, Mich. (Apr. '39)

**Moore, W. D.,** Pres., American Cast Iron Pipe Co., Birmingham 2, Ala. (Jan. '38) *Fuller Award '42.*

**Moore, W. J.,** *see* Eugene Water Board

**Moore, Wm. R.,** Supt., Thorold Township, Thorold South, Ont., Can. (Jan. '43)

**Moorer, T. B.,** Supt., Comrs. of Public Works, Box 528, Summerville, S.C. (Nov. '31) *MP*

**Moran, James E. H.,** Chief Operator, City of Princeton, 446 S. Main St., Princeton, Ill. (Apr. '42) ★

**Morehouse, Wallace W.,** Director, Dept. of Water, Municipal Bldg., Third & Ludlow Sts., Dayton 2, Ohio (Jan. '23) *Director '38–'39, '42–'45. AM*

**Morey, David, Jr.,** San. Engr., 301–302 Praetorian Bldg., Dallas 1, Tex. (May '23)

**Morgan, E. A.,** Wellsburg, W.Va. (Affil. Jan. '39)

**Morgan, George,** Vice-Pres. & Gen. Mgr., Victaulic Co. of Canada, Ltd., 200 Bay St., Toronto 1, Ont., Can. (Jan. '41)

**Morgan, L. S.,** Dist. Engr., State Dept. of Health, Greensburg, Pa. (July '41) *P*

**Morrill, Arthur B.,** 13563 Birwood Ave., Detroit 4, Mich. (Oct. '25) *P*

**Morris, D. B.,** C. B. Lyon & Bro., Inc., 2303 Hampden Ave., St. Paul 4, Minn. (Oct. '35) *P*

**Morris, Earle H.,** *see* West Virginia Public Service Com.

**Morris, John H.,** Watershed Inspector, Bureau of Eng., State Dept. of Health, 36 Carroll St., Trenton 9, N.J. (Affil. Oct. '43)

**Morris, Rael F.,** Oswego, Kan. (Apr. '44)

**Morris, S. B.,** Gen. Mgr. & Chief Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (June '20) *Director '30–'33, '44–'45. Diven Medal '33. Vice-Pres. '43. President '44. AMP*

**Morris, T.,** Mgr., Dauphin Consolidated Water Supply Co., 15 N. 32nd St., Phila. 4, Pa. (Jan. '41)

**Morrison, A. W.,** *see* Newmarket Water & Light Com.

**Morrison, F. V.,** *see* Goodrich, B. F., Co.—Agent for Rubber Reserve Co.

**Morrison, H. H.,** Dist. Mgr., The Permutit Co., 517 Hamilton Bank Bldg., Chattanooga 2, Tenn. (July '35) *P*

**Morrison, J. H.,** *see* Warren Foundry & Pipe Corp.

**Morrison, James E.,** Mgr. of Utilities, City Hall, Renton, Wash. (Oct. '39) *MP*

**Morrison, Thomas J.,** Cons. Engr., 373 Grand Ave., Rochester 9, N.Y. (Mar. '34) *P*

**Morrow, Ben S.,** Engr. & Gen. Mgr., Bureau of Water Works, 209 City Hall, Portland 4, Ore. (Apr. '26) *Director '32–'35. Fuller Award '40. M*

**Morrow, Guy,** Mgr., Peoria Water Works Co., Peoria 2, Ill. (June '30) *M*

**Morrow, Vernal H.,** Field Engr., Dept. of Water Supply, 3451 Orleans St., Detroit 7, Mich. (Affil. July '40) *M*

**Morse, Howard Scott,** Vice-Pres. & Mgr., Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Sept. '25) *Director '30–'31, '34–'36. M*

**Morse, W. C.,** *see* Seattle Water Dept.

**Mortell, J. W., Co.,** A. R. Schuber, Sales Mgr., Kankakee, Ill. (Assoc. M. Apr. '42)

**Mortenson, Everett N.,** Chem. Eng. Div., Research Labs., Swift & Co., U.S. Yards, Chicago 9, Ill. (Jan. '44) *P*

**Morton, Roy J.,** School of Medicine, Vanderbilt Univ., Nashville 4, Tenn. (July '35) *P*

**Moseley, M. E.,** Mgr., San Gabriel Valley Water Service, 242 E. Garvey Ave., El Monte, Calif. (Oct. '38) *M*

**Moses, D. V.,** Chem. Engr., Ammonia Dept., E. I. du Pont de Nemours & Co., Box 1537, Charleston, W.Va. (July '39) *P*

**Moses, Howard E.,** Chief Engr., State Dept. of Health, 1522 N. Second St., Harrisburg, Pa. (Apr. '22) *P*

**Moses, James E.,** Shop and Meter Foreman, City Water Dept., City Hall, Durham, N.C. (Jan. '41)

**Moses, John W.,** Sales Repr., Buffalo Meter Co., 4496 East Blvd., Garfield Heights, Cleveland 5, Ohio (Jan. '39)

**Moss, N. V.,** Supt., Water Dept., City Hall, Amarillo, Tex. (July '39) *M*

**Moss, Roscoe,** Roscoe Moss Co., 4360 Worth St., Los Angeles 33, Calif. (Oct. '35)

**Mottern, R. J.,** *see* Bristol, Tenn., City of

**Moullet, Louis F.,** Mech. Engr., East Bay Munic. Utility Dist., 512—16th St., Oakland 4, Calif. (May '25)

**Mount Airy, Town of,** J. F. Bivins, Supt., City Water Dept., Mount Airy, N.C. (Corp. M. July '37)

**Mount Holly Munic. Water Dept.,** C. D. Beatty, Supt., Mount Holly, N.C. (Corp. M. Oct. '42)

**Mount Holly Water Co.,** Arthur D. Cross, Mgr. & Vice-Pres., 84 Mill St., Mount Holly, N.J. (Corp. M. Apr. '24)

**Mount Morris Water Dept.,** C. E. Kellogg, Supt., Mt. Morris, N.Y. (Corp. M. Apr. '39)

**Mount, W. R.,** *see* Edmonton, City of

**Mountford, Joseph,** Inspector, Guelph Water Works, City Hall, Guelph, Ont., Can. (Oct. '43) *A*

**Mowat, George,** Water Supply Inspector, Southern Pacific Co., 65 Market St., San Francisco, Calif. (Apr. '43)

**Mowder, Clyde L.,** Chief Engr., Investment Water Corp., Ltd., Los Angeles Investment Co., 1031 S. Broadway, Los Angeles 15, Calif. (Oct. '35) *M*

**Mowrey, J. Hase,** Mgr. of Public Utilities, 202 S. Second St., Chambersburg, Pa. (July '25)

**Mowry, Robert B.,** 645 Woodcrest Ave., Ardmore, Pa. (July '37)

**Mrva, Andrew E.,** Sr. San. Engr., Div. of Water Purification, 10220 S. Forest Ave., Chicago 28, Ill. (July '42) *P*

**Muddiman, John B. C.,** c/o Water Dept., City Hall, Kingston, N.Y. (July '39) ★

**Mudge, John Rexford,** Pres. & Gen. Mgr., Chemical Equipment Co. of California, 414 Arroyo Drive, South Pasadena, Calif. (May '24) *P*

**Muegge, O. J.,** San. Engr., State Board of Health, 656 Crandall St., Madison 5, Wis. (May '25) *P*

**Mueller Brass Co.,** B. A. Devine, Research Engr., Port Huron, Mich. (Assoc. M. June '27)

**Mueller Co.,** Frank H. Mueller, Director of Research & Development, Decatur 70, Ill. (Assoc. M. Mar. '82)

**Mueller, Edward R.,** Resinous Products & Chemical Co., 22 W. Washington Square, Philadelphia 5, Pa. (Jan. '44) *P*

**Mueller, Frank H.,** *see* Mueller Co.

**Mueller, H. M.,** Mgr., Industrial Div., The McKays Co., 473 N. Cleveland Ave., St. Paul 4, Minn. (July '38) *P*

**Muhleisen, Fred C.,** Supt., Lyndhurst Water Dept., 309 Watson Ave., Lyndhurst, N.J. (Jan. '41)

**Muhlitner, Walter,** 1131 Bensch St., Lansing 12, Mich. (Jan. '43)

**Mulhern, J. W., Jr.,** City Comptroller, City Hall, Bellingham, Wash. (Affil. Jan. '44) *A*

**Mulholland, R. A.,** 1006 Harper Lane, Austin 22, Tex. (Oct. '43) *MP*

**Mull, Charles H.,** Mgr., Vista Irrigation Dist., Vista, Calif. (Oct. '38)

**Mullen, B. J.,** Chief Plant Engr., Detroit Dept. of Water Supply, 8300 W. Warren Ave., Dearborn, Mich. (Jan. '38) *M*

**Mullen, J. N.,** *see* Houlton Water Co.

**Mullergren, Arthur L.,** Cons. Engr., 202 Fairfax Bldg., Kansas City 6, Mo. (Oct. '19) *M*

**Mulligan, D. G.,** Mountain States Inspection Bureau, Box 1740, Denver 1, Colo. (Mar. '28) *M*

**Mulligan, Leo A., Sr.,** *see* Wharton Board of Public Works

**Multiplex Mfg. Co.,** Multiplex Bldg., Berwick, Pa. (Assoc. M. May '16)

**Mundy, Ambros,** Supt., Middlesex Water Co., Woodbridge, N.J. (Mar. '14)

**Munn, Harvey T.,** Hydr. Engr., National Board of Fire Underwriters, 222 W. Adams St., Chicago 6, Ill. (Mar. '20) *M*

**Munro, Neil,** Engr., The Dorr Co., Victory Bldg., Toronto 1, Ont., Can. (July '44) *P*

**Munroe, James A., & Sons,** James E. Munroe, 160 N. Washington St., North Attleboro, Mass. (Assoc. M. Oct. '43)

**Munroe, James E.,** *see* Munroe, James A., & Sons

**Munroe, Walter C.,** Chief Engr., Anne Arundel County Sanitary Com., Old High School Bldg., Green St., Annapolis, Md. (Jan. '24) *P*

**Murchison, H. A.,** Salesman, The Permutit Co., 131 E. Bay St., Jacksonville 2, Fla. (Apr. '37)

**Murden, X. D.,** Supt., Portsmouth Water Dept., Box 496, Portsmouth, Va. (July '41) *M*

**Murdoch, John H., Jr.,** Attorney, American Water Works & Elec. Co., 50 Broad St., New York 4, N.Y. (May '30) *A*

**Murdoch, William J.,** San. Engr., 3984 Drexel Rd., Pittsburgh, Pa. (Jan. '36)

**Murphy, Alvin R.,** Route 12, Knoxville, Tenn. (Apr. '11) *P*

**Murphy, Harley A.,** Supt. of Water, 625 Main St., Vestal, N.Y. (Oct. '43)

**Murphy, J. P.,** Foreman, Water Dept., 119 King St., La Crosse, Wis. (Oct. '39)

**Murphy, James P.,** Filter Plant Supt., 119 Reformatory Ave., Pontiac, Ill. (Apr. '38) *P*

**Murphy, U. S.,** *see* Beaumont Irrigation Dist.

**Murphysboro Water Co.,** F. D. Bohannon, Mgr., 1101 Chestnut St., Murphysboro, Ill. (Corp. M. Oct. '43)

**Murray, A. L.,** *see* General Utilities Co., Ltd.

**Murray, Alban J. M.,** 29 Eton Rd., Lindfield, N.S.W., Australia (Jan. '40)

**Murray, J. J., Jr.,** Chemist & Bacteriologist, Murray Lab., Capers Bldg., Greenville, S.C. (July '35) *P*

**Murray, Joseph F.,** Engr. of Special Assignments, Div. of Water, 101 City Hall Annex, Newark 2, N.J. (Jan. '42)

**Murray, Joseph J.,** Water Comr., Water Dept., 184 Washington St., Newton, Mass. (Oct. '39)

**Muscatine City Water Works,** 127 E. Third St., Muscatine, Iowa (Corp. M. May '21)

**Musgrave, A. S. G.,** Munic. Engr., Corp. of Dist. of Oak Bay, Municipal Hall, Oak Bay, B.C., Can. (Apr. '42)

**Musser, H. P.,** Pres., Mullens Water Works, 709 Security Bldg., Charleston 1, W.Va. (Oct. '22) *M*

**Musser, John Wesley,** Sr. Chemist, Water Dept., 434 Delia St., Flint 5, Mich. (July '43) *MP*

**Mussi, A. P.,** Water Works Engr., 10 Felix St., Rochester 6, N.Y. (July '35) *MP*

**Mutzberg, F. A.,** San. Engr., Post Engr. Div., Fort Bragg, N.C. (Apr. '41)

**Myerly, L. Edgar,** Asst. to Chief Engr., Dept. of Public Works, 1730 Montpelier St., Baltimore, Md. (Oct. '42)

**Myers, E. I.,** Cons. Engr., 337 Law Bldg., Kansas City 6, Mo. (Jan. '43) *AMP*

**Myers, E. L.,** Myers & Noyes, Cons. Civ. Engrs., 2204 Tower Petroleum Bldg., Dallas 1, Tex. (July '35) *P*

**Myers, Henry C.,** San. Engr., California Water & Telephone Co., R. 1, Box 120, Palm City, Calif. (July '38) *P*

**Myers, James W., Jr.,** *see* Kenosha Water Dept.

**Myers, Robert J.,** Resinous Products & Chemical Co., Richmond & Kennedy Sts., Philadelphia 37, Pa. (Oct. '40) *P*

**Myers, Wm. G.,** City Engr., Municipal Bldg., Harrisonburg, Va. (July '39)

**Myles, Geo. W.,** Supt. of Public Works, Tawas City Water Dept., 222 Second Ave., Tawas City, Mich. (Affil. July '42)

**Naehr, Harry F.,** Supt. of Plants, U.S. Engrs., Box 1523, Fort Benning, Ga. (Oct. '43)

**Nally, Harvey D., Jr.,** San. Engr., Kanawha County Health Dept., 1544 Lee St., Charleston, W.Va. (Affil. Jan. '42) ★

**Nash, H. D.,** Neptune Meter Co., 1129 N.E. 15th St., Oklahoma City 5, Okla. (Apr. '43)

**Nasi, Kaarlo W.,** U.S. Public Health Service Dist. No. 10, Federal Bldg., Honolulu, T. H. (Jan. '38)

**Nassau County Dept. of Health,** J. L. Barron, Director, Div. of Sanitation, West Unit, Nassau County Courthouse, Mineola, N.Y. (Corp. M. Apr. '40)

**National Aluminate Corp.,** 6216 W. 66th Pl., Chicago 38, Ill. (Assoc. M. June '26)

**National Automatic Sprinkler Assn.,** F. C. Vogel, Secy.-Treas., 205 E. 42nd St., New York 17, N.Y. (Corp. M. Jan. '42)

**National Council for Stream Improvement of Paper, Pulp & Paperboard Industries,** Harry W. Gehm, Technical Advisor, 271 Madison Ave., New York 16, N.Y. (Corp. M. July '44)

**National Lead Co.,** Titanium Div., H. A. Wineke, Chief Industrial Engr., Box 58, South Amboy, N.J. (Corp. M. July '37)

**National Meter Div.,** Pittsburgh Equitable Meter Co., A. R. Whittaker, Gen. Mgr., 4207 First Ave., Brooklyn 32, N.Y. (Assoc. M. Mar. '82)

**National Soap & Chemical Co.,** A. H. Leifgren, 110—5th Ave., S.E., Minneapolis, Minn. (Assoc. M. July '39)

**National Tube Co.,** W. L. Schaeffer, 602 Frick Bldg., Box 266, Pittsburgh 30, Pa. (Assoc. M. May '21)

**National Water Main Cleaning Co.,** Clinton Inglee, Pres. & Gen. Mgr., 30 Church St., New York 7, N.Y. (Assoc. M. July '06)

**Naylor, G. W.,** Mgr., Riverton Consolidated Water Co., Box 146, Lemoyne, Pa. (July '35) *M*

**Neath, Richard H.,** Foreman, Public Utilities Com. of Owen Sound, Water Dept., 726—1st Ave. E., Owen Sound, Ont., Can. (Jan. '41) *M*

**Nedwed, Arthur A.,** Supt., Bureau of Water, 2517 S. 50th Ave., Cicero, Ill. (Jan. '41)

**Neenah City Water Works,** Everett Westphal, Supt., Neenah, Wis. (Corp. M. Apr. '39)

**Negri, Mario L.,** Director, Tecnico de Provincias y Territorios Nacionales, Obras Sanitarias de la Nacion, Buenos Aires, Argentina, S.A. (July '42)

**Nehi Corp.,** John Q. Davis, Bottlers' Service Dept., Columbus, Ga. (Corp. M. July '38)

**Neighbour, H. M.,** Supt., Water & Sewers, City Hall, Santa Ana, Calif. (Oct. '37)

**Neihaus, Arnold,** *see* East Moline Water Works Dept.

**Neill, Clayton B.,** Civ. Engr., Box LL Carmel, Calif. (Oct. '35)

**Nelson, Ben. O.,** City Engr., Pullman, Wash. (Jan. '40)

**Nelson, Earl C.,** *see* Dover Water Comrs.

**Nelson, Fred B.,** 725 Riverside Drive, New York 31, N.Y. (July '07) *M*

**Nelson, Frederick G.,** Asst. Mgr., Sanitary Div., The Dorr Co., 1838 La Salle-Wacker Bldg., Chicago 1, Ill. (Apr. '42) *P*

**Nelson, Geo. A.,** *see* Boone Water Dept.

**Nelson, H. Lloyd,** Eastern Sales Mgr., U.S. Pipe & Foundry Co., 1624 Lincoln-Liberty Bldg., Broad & Chestnut Sts., Philadelphia 7, Pa. (May '30) *Director '38–'39. MP*

**Nelson, Jos. S.,** *see* Sioux Falls Water Works

**Nelson, Roy Andrew,** Supervisor, Water Main Distr., Bureau of Water, 1609 Union St., McKeesport, Pa. (Jan. '43)

**Nelson, Samuel B. S.,** Asst. Field Engr., Bureau of Water Works & Supply, 251 S. Larchmont Blvd., Los Angeles 4, Calif. (Oct. '34)

**Nenzel, Peter A.,** Engr., California Water & Telephone Co., 300 Montgomery St., San Francisco 4, Calif. (Oct. '38) *M*

**Neptune Meter Co.,** 50 W. 50th St., New York 20, N.Y. (Assoc. M. Aug. '94)

**Nesin, Benjamin C.,** Chemist-in-Charge, Mt. Prospect Lab., 355 Park Pl., Brooklyn 17, N.Y. (Oct. '37) *P*

**Neusius, Frank,** Supt., Royal Oak Township Water Dept., 23050 John R St., Hazel Park, Mich. (Apr. '44)

**Nevada Irrigation Dist.,** William Durbrow, Mgr., 144 S. Auburn St., Grass Valley, Calif. (Corp. M. Oct. '42)

**Nevling, J. B.,** Pres., Clearfield Water Co., Clearfield, Pa. (Oct. '14)

**New Jersey State Water Policy Com.,** George S. Burgess, Chairman, 519 Main St., East Orange, N.J. (Corp. M. Apr. '36)

**New Jersey Water Co.,** C. D. Moon, Mgr., 610 Station Ave., Haddon Heights, N.J. (Corp. M. Jan. '27)

**New Mexico Power Co.,** M. C. Heffelman, Vice-Pres. & Gen. Mgr., Box 1684, Santa Fe, N.M. (Corp. M. Mar. '24)

**New Mexico Power Co.—Agua Pura Div.,** E. A. Bradner, Mgr., Las Vegas, N.M. (Corp. M. May '09)

**New Mexico Public Service Com.,** C. E. McGinnis, Chairman, Box 561, Santa Fe, N.M. (Corp. M. Jan. '44)

**New Rochelle Water Co.,** J. E. Flanders, Operating Vice-Pres., 29 Cottage Pl., New Rochelle, N.Y. (Corp. M. Jan. '27)

**New Toronto Public Utilities Com.,** A. H. R. Thomas, Mgr., 874 Lake Shore Rd., New Toronto, Toronto 14, Ont., Can. (Corp. M. Jan. '33)

**New Westminster, City of,** Andrew Hunter, Water Works Supt., 8th St. & 8th Ave., New Westminster, B.C., Can. (Corp. M. Jan. '36)

**New York State Conservation Dept.,** George E. Burdick, Jr. Aquatic Biologist, 21 S. Fitzhugh St., Rochester 4, N.Y. (Corp. M. Oct. '42)

**Newby, William M.,** 97 Light St., Woodstock, Ont., Can. (Jan. '44)

**Newell, Clark,** Supt. of Water Works, Provo, Utah (July '28) *MP*

**Newell, H. E.,** Local Mgr., Missouri Utilities Co., Webb City, Mo. (Apr. '44)

**Newkirk, S. F., Jr.,** Engr. & Supt., Board of Water Comrs., 101 City Hall, Elizabeth 4, N.J. (Oct. '27) *Director '38–'41. Diven Medal '42. Fuller Award '43. Vice-Pres. '44. President '45. M*

**Newland, S. H.,** Dist. Engr., Wallace & Tiernan Co., Inc., 2414—13th St., Lubbock, Tex. (Oct. '39) *P*

**Newlands, James A.,** San. Engr., 11 Laurel St., Hartford 6, Conn. (Oct. '14)

**Newman, Alfred C.,** City Mgr., Leesburg, Fla. (July '37) *M*

**Newmarket Water & Light Com.,** A. W. Morrison, Supt., Newmarket, Ont., Can. (Corp. M. Jan. '41)

**Newnam, F. H.,** Supt. of Production, Filter Plant, Water Dept., Beaumont, Tex. (Jan. '44)

**Newnan Water & Light Com.,** Roswell C. Atkinson, Secy., Municipal Bldg., Newnan, Ga. (Corp. M. July '42)

**Newquist, O. A.,** Mgr., Muncie Water Works Co., 316 S. Mulberry St., Muncie, Ind. (Jan. '44) *M*

**Newsom, Reeves,** Village Mgr., Scarsdale, N.Y. (Nov. '18) *Director '35–'38, '39–'40. President '39. AM*

**Newton, Harry E.,** Mgr., The Spring Water Co., Kane, Pa. (Oct. '40) *M*

**Newtown, Citizens Water Supply Co. of,** J. Edward Meyer, 83–11 Whitney Ave., Elmhurst, N.Y. (Corp. M. Jan. '11)

**Niagara Alkali Co.,** 60 E. 42nd St., New York 17, N.Y. (Assoc. M. Apr. '13)

**Niagara Water Dept.,** J. H. Brown, Supt., Niagara-on-the-Lake, Ont., Can. (Corp. M. Jan. '43)

**Nice, Max,** Asst. Civ. Engr., Dept. of Water Supply, Gas & Elec., 2449 Municipal Bldg., New York 7, N.Y. (Jan. '43) *MP*

**Nichol, K. E.,** Lake Shore Water Com., Supt., Oakville, Ont., Can. (July '44)

**Nichols, M. Starr,** Chemist, State Lab. of Hygiene, Madison 6, Wis. (Jan. '26) *P*

**Nichols, R. H.,** Water Control Station Engr., Seattle Water Dept., Route 1, Box 652, Renton, Wash. (July '44)

**Nichols, Robert L.,** San. Engr., 3rd Army Corps Area, Savage, Md. (Apr. '43)

**Nicklin, H. S.,** *see* Guelph, City of

**Nicklis, James A.,** Dist. Repr., Wallace & Tiernan Co., Inc., 1957 Lower Chelsea Rd., Columbus, Ohio (Apr. '39)

**Nicol, Thomas Bruce,** Civ. Engr., 341 Pitt St., Sydney, N.S.W., Australia (July '33)

**Niedrich, August J.,** Chemist, 1453 E. 58th St., Brooklyn, N.Y. (July '41)

**Niemeyer, Howard W.,** Supt. of Distr., Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Apr. '30)

**Nihiser, A. L.,** Sr. Operating Engr., Fort Benjamin Harrison, 6136 Lowell Ave., Indianapolis, Ind. (Oct. '43) *M*

**Niles, P. B.,** *see* American Water Works & Elec. Co., Inc.

**Niles, Thomas M.,** Greeley & Hansen, 6 N. Michigan Ave., Chicago 2, Ill. (Oct. '41) *P*

**Nisbet, Geo. A.,** Supt., Water Dept., Box 554, Palisade, Colo. (Oct. '34)

**Niteroi, Cia Brasileira de Aguas e Esgotos de,** Passo de Patria, 156, Niteroi, Brazil, S.A. (Corp. M. Apr. '44)

**Nix, Lewis E.,** Mgr., City Utilities, Gonzales, Tex. (Oct. '43)

**Noble, Ralph E.,** 10140 Rhodes Ave., Chicago 28, Ill. (Mar. '27) *P*

**Noel, Carl F.,** Dist. Repr., A. P. Smith Mfg. Co., 428—13th St., Oakland 12, Calif. (July '43) *P*

**Noguera S., Gustavo,** Chief San. Engr., Ministry of Health & Labor, Apdo. 1509, Bogota, Colombia, S.A. (Apr. '38)

**Non-Corrosive Products Co.,** Edward W. Seymour, Mgr., 2016 Laura Ave., Huntington Park, Calif. (Assoc. M. July '41)

**Norcom, George D.,** Cons. San. Engr. & Chemist, 90 Broad St., New York 4, N.Y. (June '21)

**Nordell, Eskel,** Chemist, The Permutit Co., 330 W. 42nd St., New York 18, N.Y. (Apr. '37) *P*

**Nordholm, H. E.,** *see* Red Wing Board of Water Comrs.

**Noreus, Robertson E.,** Mgr., Technical Dept., Northwest Paper Co., Cloquet, Minn. (Oct. '38)

**Norman, Clifford,** Supt., Bedford Water Works, City Hall, Bedford, Ind. (Jan. '40)

**Norman, Earl E.,** Mgr., City Light & Water Utilities, City Hall, Kalamazoo 9, Mich. (Sept. '24) *AMP*

**Norris, M. Alvin,** Chemist, Orlando Utilities Com., Box 3193, Orlando Fla. (Feb. '27)

**North Bay, City of,** G. E. Elnor, City Foreman, City Hall, Ferguson St., North Bay, Ont., Can. (Corp. M. Jan. '37)

**North Carolina, Univ. of,** H. E. Thompson, Supt. of Utilities, Box 391, Chapel Hill, N.C. (Corp. M. Oct. '42)

**North Creek Water Dist.,** Kenneth Davis, Supt., North Creek, N.Y. (Corp. M. July '40)

**North York, Township of,** G. H. Baker, Water Works Supt., Willowdale, Ont., Can. (Corp. M. Feb. '32)

**Northern Indiana Public Service Co.,** E. D. Anderson, Vice-Pres., 5265 Hohman Ave., Hammond, Ind. (Corp. M. Jan. '36)

**Northington, K. V.,** Water Supt., Ballinger, Tex. (July '35) *M*

**Northrop, Guy C.,** Gen. Sales Mgr., Hydraulic Development Corp., 50 Church St., New York 7, N.Y. (Oct. '33) *Director '36–'37. M*

**Northrop, L. E.,** Mgr., Los Angeles Branch Office, Neptune Meter Co., 701 E. Third St., Los Angeles 13, Calif. (Sept. '29)

**Norton, Brayton S.,** *see* Laguna Beach County Water Dist.

**Norton, John F.,** Research Labs., The Upjohn Co., Kalamazoo 99, Mich. (May '26) *P*

**Norton, Louis G.,** *see* Saticoy Water Co.

**Nova Scotia Board of Insurance Underwriters,** H. R. Snuggs, Mgr., 50 Sackville St., Halifax, N.S., Can. (Corp. M. Oct. '40)

**Novasel, J. N.,** Pres., Victory White Metal Co., 6100 Roland Ave., Cleveland 4, Ohio (Jan. '43) *M*

**Noyes, A. J.,** *see* Deming Water Dept.

**Noyes, E. N.,** Cons. Engr., Myers & Noyes, 303 Furman Bldg., Corpus Christi, Tex. (Apr. '43) *P*

**Nuebling, Edward,** Civ. Engr., 525 W. 238th St., Riverdale, New York, N.Y. (Mar. '25)

**Nunez, Luis Alberto,** Prof. of Hydraulics, Univ. of Havana, Calle 23 No. 1258, Vedado, Havana, Cuba (Jan. '41)

**Nunn, Henry E.,** 827 Tennessee St., Lawrence, Kan. (Oct. '34) ★

**Nussbaumer, Newell L.,** Nussbaumer & Clarke, Inc., Engrs., 327 Franklin St., Buffalo 2, N.Y. (May '34) *P*

**Nutley Water Dept.,** C. A. Sherwood, Town Hall, Nutley, N.J. (Corp. M. July '43)

**Nutt, J. A.,** Mgr., Monongahela City Water Co., Monongahela City, Pa. (Apr. '43) *M*

**Nutting, H. C.,** Pres., H. C. Nutting Testing Engrs., 4120 Airport Rd., Cincinnati 26, Ohio (Apr. '40)

**Nutting, H. C., Testing Engrs.,** 4120 Airport Rd., Cincinnati 26, Ohio (Assoc. M. Sept. '33)

**Nutting, N. C.,** Dist. Mgr., California Water Service Co., 615 Estudillo St., Martinez, Calif. (Sept. '33)

**Oakville Water & Light Com.,** H. B. Lofquist, Chairman, Oakville, Ont., Can. (Corp. M. Apr. '34)

**Oberholtz, Lester,** Asst. Sales Mgr., Alco Products Div., 30 Church St., New York 6, N.Y. (Jan. '41)

**Oberlin, Leary L.,** 265 Crystal Lake Drive, Pontiac, Mich. (Oct. '43)

**Oberly, H. T.,** Supt., Water Distr., St. Petersburg 4, Fla. (Oct. '39) *M*

**Oberndorfer, M. W.,** Box 33, Norfolk 1, Va. (Oct. '43)

**Obras Sanitarias de la Nacion,** *see* Argentina

**Obreiter, Jos. W.,** *see* Bloomfield, Town of

**O'Brien, C.,** *see* Cook, A. D., Inc.

**O'Brien, Denis F.,** A. P. Smith Mfg. Co., East Orange, N.J. (Jan. '35) *Honorary M. '35. Director '30–'39, '40–'43.*

**O'Brien, Earl F.,** Cons. Engr., 117 James St., Syracuse 2, N.Y. (Apr. '43) *P*

**O'Brien, Hubert F.,** *see* Smith, A. P., Mfg. Co.

**Ocala Water Dept.,** Lloyd H. Lutz, Supt., Ocala, Fla. (Corp. M. Apr. '38)

**Ockershausen, Richard W.,** Eng. Service Dept., General Chemical Co., Edgewater, N.J. (Apr. '37) *P*

**O'Connell, Wm. J., Jr.,** Technical Consultants, Ltd., 604 Mission St., San Francisco 5, Calif. (Apr. '41) *P*

**O'Connor, Philip J.,** Supervisor of Filtration & Chief Chemist, 821 Kenilworth Ave., S.E., Warren, Ohio (Feb. '22) *MP*

**O'Connor, T. Francis,** Assoc. San. Engr., War Dept., O.C.E., 425 Turner St., Chevy Chase 15, Md. (Jan. '44)

**Oconomowoc Water Dept.,** John W. Bolson, Supt., Oconomowoc, Wis. (Corp. M. June '29)

**Odell, Rex E.,** Water Comr., Water Dept., City Hall, Bellingham, Wash. (Affil. Jan. '43) *M*

**O'Dell, Wilson H.,** Supt. of Public Works, 30 W. Main St., Webster, N.Y. (Jan. '37) *A*

**Odor, W. Ray,** Sales Mgr., Lynchburg Foundry Co., Lynchburg, Va. (Jan. '39)

**Oeffler, W. A.,** Supt., Jasonville Water Dept., 120 S. Lawton St., Jasonville, Ind. (Jan. '37)

**Oelkers, Carl L.,** City Engr., City Hall, North Tonawanda, N.Y. (Apr. '37)

**Oelklaus, Walter G.,** Supt., Munic. Water Works, 101 S. Main St., St. Charles, Mo. (Apr. '40) *M*

**Offutt, Frank M.,** Supt., Water Dept., Williamson, W.Va. (July '35) *M*

**Ogborn, Courtney M.,** 148 State St., Johnstown, Pa. (Apr. '37)

**Ogden, John B.,** Asst. Engr., Passaic Valley Water Com., 137 Ellison St., Paterson 1, N.J. (July '38) *M*

**Ogden, William H.,** Vice-Pres., South Bay Consolidated Water Co., 60 Glen St., Glen Cove, N.Y. (July '35) *AM*

**Ogden, Willis L.,** 905 S. First St., Champaign, Ill. (Jr. M. Nov. '43)

**Oglebay, G. J.,** *see* Indiana, Public Service Co. of

**O'Gorman, Dan R.,** Chemist, St. Louis Water Dept., Chesterfield, Mo. (July '44)

**Ohge, H. C.,** Field Engr., Clayton Mfg. Co., 5324 Primrose Ave., Indianapolis 5, Ind. (Apr. '43) *P*

**Ohio Salt Co., The,** H. M. Olson, Advisory Maint. Engr., 171 Longue Vue Drive, Mt. Lebanon, Pittsburgh 16, Pa. (Assoc. M. Oct. '37)

**Ohland, Harold M.,** Hydr. Engr., Water Dept., 22 City Hall, Jersey City, N.J. (July '37)

**Ohr, Milo F.,** 3824 Sequoyah Ave., Knoxville, Tenn. (Jan. '42)

**Ohrt, Frederick,** *see* Honolulu Board of Water Supply

**Oil City Bureau of Water,** J. M. Sharp, Director, Oil City, Pa. (Corp. M. July '34)

**Oke, Ernest E. W.,** Mgr.-Engr., Public Utilities Com., Cochrane, Ont., Can. (July '34) *A*

**Olean Water Dept.,** N. M. Fuller, Supt., City Hall, Olean, N.Y. (Corp. M. Apr. '29)

**O'Leary, Frederick J.,** West Coast Engr., The Barrett Div.—Allied Chemical & Dye Corp., 211½ S. Poinsetta Pl., Los Angeles 6, Calif. (Oct. '34)

**O'Leary, J. E.,** *see* Pittsburgh-Des Moines Steel Co.

**Olien, H. C.,** Chemist, Cudahy Bros. Co., Cudahy, Wis. (July '43)

**Olin, Hubert Leonard,** Prof. of Chem. Eng., Univ. of Iowa, Iowa City, Iowa (Apr. '40) *P*

**Olsen, Frank A.,** Mgr., Sunny Slope Water Co., 1040 El Campo Drive, Pasadena 8, Calif. (Apr. '43)

**Olsen, Fred J.,** Supt., Palatine Hill Water Dist., 255 S.W. Breyman St., Portland 1, Ore. (Apr. '40)

**Olsen, Harry** *see* California Oregon Power Co.

**Olsen, William C.,** Cons. Engr., Raleigh, N.C. (Dec. '21) *Fuller Award '42. P*

**Olson, H. M.,** *see* Ohio Salt Co.

**Olson, Oscar A.,** Engr., Mercer Island Co-operative Water Assn., Box 103, Mercer Island, Wash. (Apr. '44) *M*

**Olson, Oscar E.,** Water Works Engr., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Apr. '37)

**Olson, W. M.,** 436 Normal Parkway, Chicago 21, Ill. (Apr. '26) *MP*

**Omaha Metropolitan Utilities Dist.,** Utilities Bldg., Harney at 18th St., Omaha, Neb. (Corp. M. Apr. '12)

**O'Mara, Edmund M.,** 137 Elizabeth St., Chatham, Ont., Can. (Oct. '43) *MP* ★

**O'Mealia, F. J.,** Supt., Water Dept., Le Roy, N.Y. (Jan. '36)

**Omega Machine Co., Inc.,** L. E. Harper, Pres., 9 Codding St., Providence 1, R.I. (Assoc. M. Jan. '30)

**O'Neill, Chris,** Supt. of Water, Lake Geneva, Wis. (Feb. '30) *M*

**O'Neill, John H.,** State Board of Health, New Orleans 7, La. (Apr. '25)

**O'Neill, Ralph W.,** Supt., Water & Disposal, Basic Magnesium, Inc., 520 Ave. L, Boulder City, Nev. (Jan. '44) *MP*

**Ongerth, Henry J.,** Assoc. San. Engr., Bureau of San. Eng., 1911-B Berryman St., Berkeley 7, Calif. (Oct. '39) *P*

**O'Nial, William O.,** Technical Officer, Filtration & Water Softening Pty., Ltd., 395 Collins St., Melbourne C. 1, Australia (Jan. '36)

**Opalco Lab.,** Henry L. Frazier, Mgr., R.F.D. No. 1, Box 20, McKeesport, Pa. (Assoc. M. July '43)

**Orchard, William J.,** San. Engr., Box 178, Newark 1, N.J. (Aug. '17) *Director '36–'38, '41–'44. Honorary M. '37. P*

**O'Reilly, A. R.,** 1416 Rose Virginia Rd., Reading, Pa. (May '25)

**Orillia Water, Light & Power Com.,** L. G. McNeice, Water Works Engr., Orillia, Ont., Can. (Corp. M. Apr. '34)

**Orlando Public Utilities Com.,** M. W. Brown, Gen. Mgr., Orlando, Fla. (Corp. M. Aug. '33)

**Ornstein, Georg,** 120 Cabrini Blvd., New York 33, N.Y. (Jan. '28) *P*

**Orr, John L.,** Supt., Baltimore, Ohio (July '44) *P*

**Ortega, Enrique,** Technical Director, Govt. of City of San Juan, Box 218, San Juan, P.R. (Jan. '42)

**Ortenzio, Louis F.,** Chemist, 3603—43rd Ave., Brentwood, Md. (Apr. '43) *P*

**Osberg, Alfred T.,** Supt.-Gen. Mgr., King County Water Dist. No. 20, 11860 DesMoines Way, Seattle 88, Wash. (Apr. '44)

**Osborn, L. C.,** *see* Loveland, City of

**Osborn, L. M.,** Johns-Manville Sales Corp., 608—16th St., Oakland 12, Calif. (Jan. '38)

**Osborne, James Q.,** Dist. Mgr., De Laval Steam Turbine Co., 706—3rd Ave., Seattle 4, Wash. (Jan. '28)

**Oshawa Public Utilities Com.,** G. F. Shreve, Gen. Mgr. & Secy., 100 Simcoe St., S., Oshawa, Ont., Can., (Corp. M. Jan. '33)

**Ossining Board of Water Comrs.,** Wallace T. Miller, Supt., Municipal Bldg., Ossining, N.Y. (Corp. M. Jan. '42)

**Ossolinski, John L.,** Designing Engr., Whitman & Howard, Cons. Engrs., 89 Broad St., Boston, Mass. (Jan. '44)

**Ostrander, Jay H.,** *see* Canastota Water Dept.

**Oswego Dept. of Water,** Joseph A. Wallace, Pres., Oswego, N.Y. (Corp. M. June '21)

**Osweiler, Paul L.,** *see* Lewistown Pipe Co.

**Ouellette, Lloyd J.,** Head Acct., Dept. of Water Supply, 735 Randolph St., Detroit 26, Mich. (Jan. '40) *A*

**Overholt, G. T.,** New York Sales Agent, U.S. Pipe & Foundry Co., 71 Broadway, New York 6, N.Y. (Oct. '39)

**Overstreet, Ralph M.,** 1317 S. 4th St., Louisville 8, Ky. (Jan. '27)

**Oviatt, Geo. R.,** Supt. & Gen. Mgr., Smethport Water Co., Smethport, Pa. (Jan. '39)

**Owatonna Munic. Public Utilities,** John Shimpach, Supt., Owatonna, Minn. (Corp. M. July '44)

**Owego Water Works,** Arthur B. Stiles, Pres., Owego, N.Y. (Corp. M. Apr. '14)

**Owen, Herbert T.,** Dist. Mgr., Public Service Co. of Indiana, Inc., Rochester, Ind. (Apr. '44)

**Owen, Marvin H.,** Engr. in Charge of Operation, Pumping Plant & Reservoir Div., Los Angeles Dept. of Water & Power, 11147 La Maida St., North Hollywood, Calif. (Apr. '33)

**Owings, Noble L.,** Asst. Engr., Washington Suburban Sanitary Dist., Riverdale, Md. (Jan. '23)

**Owosso Water Dept.,** Walter H. Bennett, Comr. of Public Utilities, Owosso, Mich. (Corp. M. July '41)

**Ozone Processes, Inc.,** Stanley Jenks, Director of Trade Relations, 1500 Walnut St., Philadelphia 2, Pa. (Assoc. M. Jan. '40)

**Pace, Albert A.,** Chem. Engr., Duquesne Light Co., 2101 Beaver Ave., Pittsburgh 12, Pa. (Apr. '41) *P*

**Pacific States Cast Iron Pipe Co.,** Box 18, Provo, Utah (Assoc. M. Oct. '27)

**Pack, W. F., Jr.,** Supt. of Water Works, Virginia Polytechnic Institute, Blacksburg, Va. (Oct. '43)

**Padgett, Robt.,** Supt., City Water Dept., Puyallup, Wash. (Apr. '44)

**Pados, Frank,** *see* Alpha, Borough of

**Paducah Water Works,** (Miss) Lois Sutherland, Treas., Paducah, Ky. (Corp. M. Jan. '34)

**Paessler, Alfred H.,** Acting Supt., Filter Plant, Box 1160, Austin 4, Tex. (Oct. '43)

**Page, Blaine,** 111 S. Franklin St., Shawano, Wis. (July '35) *M*

**Page, Bruce W.,** Chief of Police, Box 572, Richland, N.C. (Oct. '42)

**Page, George C.,** Engr., Kennicott Water Softener Co., Ltd., Wolverhampton, England (June '30)

**Page, Geo. W.,** *see* Trenton Water Works

**Page, Hutcheson,** Chappaqua, N.Y. (July '41) *P*

**Paget, Walter B.,** Supt. & Plant Operator, Boro Water Dept., Claysville, Pa. (Apr. '43) *M*

**Paine, G. G.,** *see* Everett Water Dept.

**Painter, Carl Elliott,** Vice-Pres. & Cons. Engr., Water Works Equipment Co., Salt Lake City 1, Utah (Mar. '24)

**Paitovi, Antonio,** Calle Rivadavia 5040, Buenos Aires, Argentina, S.A. (July '19)

**Palisadas Del Rey Water Co.,** C. C. Hagar, Gen. Mgr., 411 W. 5th St., Los Angeles 13, Calif. (Corp. M. Oct. '43)

**Pallo, Peter E.,** Asst. San. Engr., Hackensack Water Co., Oradell, N.J. (Jr. M. Jan. '41)

**Palm Springs Water Co.,** Jno. P. Holditch, Secy., 844 N. Palm Canyon Drive, Palm Springs, Calif. (Corp. M. Oct. '37)

**Palmer, B. F.,** Chief Operator, Filter Plant, Newport News Water Works Com., Tabbs, Va. (Oct. '43)

**Palmer, C. E.,** Box 1655, Erie, Pa. (Oct. '40) *P*

**Palmer, F. F.,** City Engr., Box 486, Forsyth, Mont. (July '34)

**Palmer, Henry Austin,** Water Works Engr., The Causeway, Staines, Middlesex, England (May '30)

**Palmer, R.M.,** Chem. Engr., 381 Fourth Ave., New York 16, N.Y. (Apr. '30) *P*

**Pampa Water & Sewage Dept.,** J. B. Massa, Water Supt., Box 739, Pampa, Tex. (Corp. M. Jan. '44)

**Pan American Refining Corp.,** R. H. Price, Research Lab., Texas City, Tex. (Corp. M. Jan. '42)

**Parbury, Charles B.,** Local Mgr., California Water Service Co., Box 112, Redondo Beach, Calif. (Apr. '41) *M*

**Pardoe, William S.,** Prof. of Hydr. Eng., Univ. of Pennsylvania, Philadelphia, Pa. (Apr. '44)

**Paris Public Utilities Com.,** George Boucher, Supt., Box 180, Paris, Ont., Can. (Corp. M. Jan. '42)

**Park, J. H.,** City Mgr., City Hall, Compton, Calif. (Jan. '39) *A*

**Parker, Earl,** Supt., Water & Sewer Dept., Gladewater, Tex. (Oct. '43)

**Parker, Francis L.,** *see* Parker Lab.

**Parker, I. Curtiss,** Cons. Engr., Parker & Hill, 2021 Smith Tower, Seattle 4, Wash. (Jan. '41)

**Parker, J. C.,** Supt., Public Utility Com., Main & Martin Sts., Elizabeth City, N.C. (Jan. '39)

**Parker Lab.,** Francis L. Parker, Cons. Chemist, 40 Broad St., Charleston 3, S.C. (Corp. M. Jan. '39)

**Parker, Roy A.,** Abner Hood Chemical Co., 507–17 N. Montgall Ave., Kansas City 1, Mo. (Jan. '44)

**Parkhurst, E. R.,** Sales Mgr., Rensselaer Valve Co., Troy, N.Y. (July '40)

**Parkinson, Eugene,** Supt., Water Works, Box 294, Port Credit, Ont., Can. (Jan. '40) ★

**Parks, C. A.,** Johns-Manville Sales Corp., 777 Thomas St., Seattle 9, Wash. (May '38)

**Parks, Edward E.,** Operator, Filtration Plant, City Water Dept., Harlem, Mont. (Apr. '42)

**Parks, James A.,** Detroit Dept. of Water Supply, 8300 W. Warren Ave., Dearborn, Mich. (Oct. '35) *P*

**Parks, W. H.,** Bennettsville, S.C. (July '35)

**Parks, W. J., Jr.,** San. Engr., Post Engr.'s Office, 65 N.E. 71st St., Miami, Fla. (Aug. '29)

**Parlett, Russell C.,** Water Chemist, Illinois Central R.R., Baggage Room, Mattoon, Ill. (Apr. '37) *P*

**Parnell, J. G.,** Supt., Board of Public Works, Niles, Mich. (Jan. '43)

**Parranto, Wm. A.,** *see* St. Paul Board of Water Comrs.

**Parratt, S. L.,** Asst. Civ. Engr., Los Angeles Dept. of Water & Power, Box 147, Independence, Calif. (Oct. '31)

**Parrish, Rial T.,** Architect-Engr., 945 U.B. Bldg., Dayton 2, Ohio (July '44) *P*

**Partridge, Everett P.,** *see* Calgon, Inc.

**Parsons, Norman W.,** County San. Engr., New Cumberland, W.Va. (Oct. '34) ★

**Pasadena Water Dept.,** Morris S. Jones, Chief Engr. & Gen. Mgr., 319 City Hall, Civic Center, Pasadena 1, Calif. (Corp. M. Oct. '24)

**Patchin, Paul,** *see* Kinderhook Water System

**Paterson, A. B.,** Pres., New Orleans Public Service, Inc., 317 Baronne St., New Orleans 9, La. (July '37)

**Paterson, Sir William,** The Paterson Engineering Co., Ltd., Windsor House, Kingsway, London, W.C. 2, England (Nov. '24)

**Patrick, E. E.,** Water Supt., Dillon, Mont. (Apr. '44)

**Patrick, J. G.,** Chemist, West Virginia Pulp & Paper Co., Luke, Md. (June '30) *P*

**Patten, Edward M.,** Supt., Greenwich Union Water Co., Greenwich, N.Y. (Oct. '41)

**Patten, G. H.,** Supt., Village of Rockville Centre, 50 Powell Ave., Rockville Centre, N.Y. (Oct. '38) *MP*

**Patterson, Howard,** Supt., Duke Power Co., Anderson, S.C. (Jan. '43)

**Patterson, J.,** *see* Brampton Water Com.

**Patterson, J. W.,** Div. Mgr., Water Utilities Service Corp., Water St., Skowhegan, Me. (Oct. '38)

**Patterson, James N.,** Chemist, Box 272, Salinas, Calif. (Oct. '35) *P*

**Patterson, Orville W.,** Supt. of Utilities, Water & Light Plant, 107 S. Holland St., Edinburg, Ind. (Jan. '44) *M*

**Patterson, Richard L.,** City Engr. & Supt. of Water Dept., Newport Beach, Calif. (Sept. '28)

**Patterson, W. L.,** Office Engr., Black & Veatch, 4706 Broadway, Kansas City 2, Mo. (July '44) *P*

**Pattison, Burt O.,** *see* Pattison's Southwest Labs.

**Pattison's Southwest Labs.,** Burt O. Pattison, Owner, 211 E. Monroe St., Box 346, Harlingen, Tex. (Corp. M. July '44)

**Patton, C. S.,** Sales Mgr., Alco Products Div., 30 Church St., New York 7, N.Y. (May '30)

**Patton, David H.,** Johns-Manville Sales Corp., 101 Marietta St., Atlanta 3, Ga. (Oct. '34)

**Patton, Horace M.,** Engr., Bureau of Water Power, Federal Power Com., 1800 Penna Ave., Washington 25, D.C. (Jan. '44) *M*

**Paul, Frank D.,** Supt. of Distr., Akron Water Works, 235 Crescent Drive, Akron 1, Ohio (Jan. '27) *MP*

**Paul, Thomas,** Chemist & Chief Operator, Water Dept., Bradenton, Fla. (July '39) *P*

**Paulson, Everett J. I.,** Chemist Operator, Fridley Softening Plant, 43rd & Marshall Sts., N.E., Minneapolis, Minn. (Jan. '41) ★

**Paulus, Harold J.,** Asst. San. Engr., Box 811, Lamarque, Tex. (July '41) ★

**Payette Water Dept.,** H. C. Lightfoot, Supt., Payette, Idaho (Corp. M. July '42)

**Payne, Byron Elbert,** Chief Engr. & Supt., Louisville Water Co., 435 S. 3rd St., Louisville 2, Ky. (July '41) *M*

**Payne Dean & Co.,** Laconia, N.H. (Assoc. M. Oct. '43)

**Payne, Gwynne,** Filter Plant Operator, 505 Church St., Spencer, W.Va. (Affil. Jan. '40)

**Payne, Thomas L., Jr.** San. Chemist, Detroit Water Supply, 8300 W. Warren Ave., Dearborn, Mich. (Jan. '40) *P*

**Payrow, Harry G.,** Assoc. Prof. of San. Eng., Lehigh Univ., Bethehem, Pa. (July '43)

**Pearce, Fletcher W.,** 3—10th St., Havre, Mont. (Jan. '42)

**Pearl, Emanuel H.,** 526 W. Lynwood, San Antonio, Tex. (Jan. '37) ★

**Pears, Matthew J.,** Chief Stationary Engr., Water Board, 425 Grove Ave., Clarksburg, W.Va. (July '44)

**Pearse, Langdon,** San. Engr., Sanitary Dist. of Chicago, S.O. Bldg., 910 S. Michigan Ave., Chicago 5, Ill. (Feb. '13)

**Pearson, Harold E.,** Agricultural Chemist, Metropolitan Water Dist., Box 38, LaVerne, Calif. (Oct. '43) *P*

**Pearson, J. F.,** Supt., Water & Light Plant, 52 S. Middleton St., Orangeburg, S.C. (Feb. '29)

**Peart, J. W.,** *see* St. Thomas Public Utilities Com.

**Pease, Maxfield,** 1900 Euclid Ave., Cleveland 15, Ohio (July '35)

**Pebworth, W. B.,** Mgr., Atlanta Office, Hersey Mfg. Co., 511 Haas Howell Bldg., Atlanta 3, Ga. (Apr. '44)

**Peck, Ermon M.,** Cons. Engr., 260 Edgewood St., Hartford, Conn. (July '07)

**Peck, Lawrence J.,** Dist. Mgr., Wallace & Tiernan Co., Inc., 11 Salisbury Rd., Elsmere, N.Y. (May '27) *P*

**Peck, W. O.,** *see* Dunkirk Board of Water Comrs.

**Pedersen, H. V.,** Supt. of Water Works, Municipal Bldg., Marshalltown, Iowa (Mar. '22) *Director '32–'35. M*

**Pedroso y Montalvo, Mario, Mgr.,** Havana Water Works, Ave. de las Americas No. 65, Miramar, Havana, Cuba (Oct. '41)

**Peerless Pump Div.,** E. W. Pierce, Sales Mgr., Box A, Station B, Canton 6, Ohio (Assoc. M. June '27)

**Pegg, Edwin S.,** Supt., Cherry Valley Water Dept., Cherry Valley, N.Y. (Oct. '42)

**Peirce, Walter A.,** Mgr., Water Dept., 2335 Carmel Ave., Racine, Wis. (June '22) *Director '32–'34, '39–'40. Fuller Award '42. AM*

**Peirson, A. G.,** Supt., Weston Public Utilities Com., Weston, Ont., Can. (Feb. '23) *P*

**Peirson, Nat. D.,** Box 47, Raleigh, N.C. (Jan. '40) *P*

**Pelkus, Elizabeth B. (Mrs.),** 113 Steamboat Rd., Great Neck, N.Y. (Jan. '41)

**Peloso, George D.,** Service Engr., Pittsburgh Equitable Meter Co., 2435 Devoe Terrace, New York, N.Y. (Oct. '42)

**Pelton, G. Dorr,** Dept. Engr., Water Dept., City Hall, Topeka, Kan. (Oct. '38)

**Pelton Water Wheel Co., The,** C. G. Crawford, 2929—19th St., San Francisco 10, Calif. (Assoc. M. Oct. '35)

**Penetanguishene Water & Light Com.,** R. J. Gauthier, Secy.-Treas., 5 Simcoe St., Penetanguishene, Ont., Can. (Corp. M. Jan. '44)

**Pennichuck Water Works,** William F. Sullivan, Pres., Nashua, N.H. (Corp. M. Oct. '14)

**Penning, Fred F.,** Supt., Wood River Munic. Water System, City Hall, Wood River, Ill. (Oct. '41)

**Pennington, Marvin,** Supt. of Public Works, 29 McKinley Ave., Steger, Ill. (Apr. '44) *M*

**Pennsylvania Salt Mfg. Co.,** B.P. Steele, Director of Sales, 1000 Widener Bldg., Philadelphia 7, Pa. (Assoc. M. June '03)

**Pensinger, John L.,** *see* Pensinger, L. C., & Son

**Pensinger, L. C., & Son,** John L. Pensinger, 1332 Oak St., Kansas City 6, Mo. (Assoc. M. Apr. '40)

**Peoria Heights Water Works Dept.,** W. J. Hartzell, Village Clerk, 124 W. Seiberling St., Peoria Heights 4, Ill. (Corp. M. Apr. '42)

**Pepin, E. J.,** *see* Havre Water Dept.

**Pepperman, C. M.,** Engr., J. E. Greiner Co., 2412 Ken-Oak Rd., Baltimore 9, Md. (Apr. '44) *P*

**Pequegnat, Marcel,** Supt., Kitchener Water Com., Kitchener, Ont., Can. (Feb. '24)

**Perez Guerra, Gustavo,** Apdo. 168, Caracas, Venezuela, S.A. (Apr. '40)

**Perhab, John L.,** *see* Beverly Hills Water Dept.

**Perkerson, Henry A.,** Production Mgr., M & H Valve & Fittings Co., Box 894, Anniston, Ala. (Apr. '41) *P*

**Perkins, J. L.,** High Point, N.C. (July '35)

**Permutit Co., The,** 330 W. 42nd St., New York 18, N.Y. (Assoc. M. Mar. '14)

**Perrine, Charles D.,** Operating Engr., Public Service Co. of Indiana, Indianapolis 4, Ind. (Jan. '37) *M*

**Perry, Aubrey H.,** Dist. Engr., Dept. of Pensions & National Health, Box 1012, Vancouver, B.C., Can. (Mar. '31)

**Perry, E. F., Jr.,** c/o Water Comrs., 134 Main St., Nyack, N.Y. (Oct. '42)

**Perry, F. M., (Mrs.),** Supt., Augusta Road, Water & Sewer Sub-Dist., Box 801, Greenville, S.C. (July '37)

**Perry, G. C.,** Mgr., Crane Co., Box 152, San Bernardino, Calif. (Jan. '41) *M*

**Perryman, John M.,** Engr., R.D. Cole Mfg. Co., Newnan, Ga. (Jan. '40)

**Peru, City of,** F. L. Kerns, Mgr., Water Dept., 19–21 E. 3rd St., Peru, Ind. (Corp. M. Apr. '44)

**Peshtigo Water Dept.,** E. H. Stibbe, Secy., Peshtigo, Wis. (Corp. M. Apr. '43)

**Peterborough Utilities Com.,** R. L. Dobbin, Gen. Mgr., 223 Aylmer St., Peterborough, Ont., Can. (Corp. M. May '11)

**Peters, J. S.,** Chief Engr. & Gen. Mgr., Marin Munic. Water Dist., San Rafael, Calif. (Jan. '27)

**Peters, Wm. A.,** *see* Jerome Water Co.

**Petersen, H. V.,** *see* De Laval Steam Turbine Co.

**Peterson, Herman S.,** Salesman, Hays Mfg. Co., Erie 6, Pa. (Jan. '44)

**Peterson, J. H.,** Johns-Manville Sales Corp., 116 New Montgomery St., San Francisco 5, Calif. (Jan. '35)

**Petry, F. C.,** Supt., Tract No. 180 Water Co., 4544 Florence Ave., Bell, Calif. (Apr. '43)

**Petty, Albert Worth,** Supervising Engr., Town Hall, Virginia Beach, Va. (Apr. '43) *MP*

**Pew, P. F.,** *see* Infilco, Inc.

**Pfeifer, J. C.,** 1402 Grand Ave., McLaughlin Heights, Vancouver, Wash. (Jan. '44)

**Pfeil, I. A.,** *see* Quigley Co., Inc.

**Pflanz, E. L.,** 695 Vernon Ave., Glencoe, Ill. (July '35)

**Pfreimer, Harold A.,** 1st Lt., Sanitary Corps, Station Hospital, Camp Edwards, Mass. (July '43) ★

**Pharoah, Harry W.,** Clymer Water Service Co., Indiana, Pa. (Dec. '27) *MP*

**Pharr, J. M.,** Chemist & Bacteriologist, Newport News Water Works Com., Denbigh, Va. (Jan. '37) ★

**Phelps, P. E., III,** 1st Lt., C.E., 2402 Delaware Ave., Wilmington 47, Del. (Jan. '44) ★

**Philadelphia Suburban Water Co.,** Van Horn Ely Jr., Mgr., 762 Lancaster Ave., Bryn Mawr, Pa. (Corp. M. May '09)

**Phillips, M. H.,** Supt., Paragould Water Works, Paragould, Ark. (July '38)

**Phillips, Norman, Jr.,** Asst. Engr., State Health Dept., 119 State Office Bldg., Richmond, Va. (Oct. '40) ★

**Phillips, R. S.,** Chief Chemist, Water Dept., 206 Dacian Ave., Durham, N.C. (Oct. '35) ★

**Phillips, Robert V.,** Civ. Eng. Assoc., Los Angeles Dept. of Water & Power, Box 131, Independence, Calif. (Oct. '43)

**Phillips, William E.,** Western Dist. Sales Mgr., Mathieson Alkali Works, Inc., 410 N. Michigan Ave., Chicago, Ill. (Jan. '43)

**Phipps & Bird, Inc.,** L. C. Bird, 303 S. Sixth St., Richmond 5, Va. (Assoc. M. Jan. '35)

**Phoenix, E. A.,** Cedar Gate, Darien, Conn. (Jan. '44)

**Phoenix Meter Corp.,** W. H. Johnson, Pres., 147 Waterbury Ave., Prince's Bay, Staten Island, N.Y. (Assoc. M. May '27)

**Piatt, William M.,** Cons. Engr., Durham, N.C. (Aug. '21) *Director '43–'46. Fuller Award '44.*

**Picado, Ramon M.,** Cons. Engr., San Jose, Costa Rica (May '30)

**Pickels, George W.,** Univ. of Illinois, 210 Engineering Hall, Urbana, Ill. (Oct. '37) *P*

**Picton, Walter L.,** Prin. Engr., Water Div., Office of War Utilities, War Production Board, 2744 Temporary R Bldg., Washington, D.C. (Apr. '43)

**Pierce, E. J.,** Mgr., The Marion Water Co., 195 E. Center St., Marion, Ohio (July '42)

**Pierce, E. W.,** *see* Peerless Pump Div.

**Pierce, J. R.,** Vice-Pres. & Gen. Mgr., Arkansas Munic. Water Co., 211 W. 5th Ave., Pine Bluff, Ark. (Jan. '43)

**Pierce, U. Bixby,** *see* Weldon Water Works

**Pile, Richard,** Supt. of Water Works, Somerset, Pa. (Mar. '30)

**Pimm, Walter O.,** *see* Milford Water Dept.

**Pincus, Sol,** San. Engr. & Deputy Comr., Dept. of Health, New York 13, N.Y. (Feb. '20) *P*

**Pinehurst, Inc.,** John F. Taylor, Supt. of Utilities, Pinehurst, N.C. (Corp. M. Oct. '42)

**Piner, Raymond E.,** Chemist, Springfield City Water Co., 801 Boonville Ave., Springfield, Mo. (July '35) ★

**Pingree, L. W.,** Wallace & Tiernan Co., Inc., 171 Second St., San Francisco 5, Calif. (Apr. '42) *P*

**Pinkerton, C. S.,** *see* Cutler-Hammer, Inc.

**Pinkham, Chesley M.,** Chief Operator, Filter Plant, Water Works Dept., 1312 Colina Lane, Santa Barbara, Calif. (Oct. '37) *MP*

**Pinkney, Mark E.,** Water Comr., Village Water Dept., Webster, N.Y. (Jan. '42) *MP*

**Pinkston, J. T.,** Supt. of Water Works, City Hall, Meridian, Miss. (Apr. '29) *M*

**Pioneer Asphalt Co.,** Joseph J. Tumpeer, Pres., 435 N. Michigan Ave., Chicago, Ill. (Corp. M. Jan. '41)

**Piper, Fred V. H.,** Operations & Management Supt., Bureau of Water, City Hall, Niagara Falls, N.Y. (Apr. '37) *M*

**Pirie, Jas.,** Sales Engr., 824 Downer, Lansing 12, Mich. (Apr. '38)

**Pirnie, Malcolm,** Cons. Engr., 25 W. 43rd St., New York 18, N.Y. (May '17)

**Pirnie, Malcolm, Jr.,** P.A. San. Engr., U.S. Public Health Service, 1223 Flood Bldg., San Francisco 2, Calif. (Oct. '39) *P*

**Pitometer Co., The,** 50 Church St., New York 7, N.Y. (Assoc. M. July '06)

**Pittsburgh Plate Glass Co.,** *see* Columbia Chemical Div.

**Pitt Construction Co., The,** E. D. Harshbarger, Pres. & Gen. Mgr., 1235 Washington Blvd., Pittsburgh 6, Pa. (Assoc. M. July '43)

**Pittsburgh Coke & Iron Co.,** S. C. Colbeck, Neville Island, Pa. (Corp. M. Oct. '42)

**Pittsburgh Equitable Meter Co.,** James L. Austin, 400 N. Lexington Ave., Pittsburgh 8, Pa. (Assoc. M. June '98)

**Pittsburgh-Des Moines Steel Co.,** J. E. O'Leary, Neville Island, Pittsburgh 25, Pa. (Assoc. M. Apr. '14)

**Pizie, Stuart,** Dist. Repr., Chicago Pump Co., 223 S.W. 31st Rd., Miami 36, Fla. (Oct. '42)

**Place, Clyde R.,** Cons. Engr., 420 Lexington Ave., New York 17, N.Y. (Jan. '42)

**Plageman, R. D.,** *see* Western Pipe & Steel Co. of California

**Plamondon, Sarto R.,** Engr., 103 Pere Marquette St., Quebec, Que., Can. (Jan. '41)

**Plattsburg, City of,** Thomas G. Burke, Supt. of Public Works, Plattsburg, N.Y. (Corp. M. Apr. '44)

**Pletcher, R. H.,** Supt., Elizabeth Township Authority, Box 164, Buena Vista, Pa. (July '43) *P*

**Plumb, D. S., Co., Inc.,** A. A. Dorfner, Gen. Mgr., 73 Norfolk St., Newark 4, N.J. (Assoc. M. June '39)

**Plummer, Raymond B.,** Prin. Engr., 4827 Chevy Chase Blvd., Chevy Chase 15, Md. (Oct. '43) *MP*

**Plummer, Wade,** Asst. Gen. Mgr., Butte Water Co., Butte, Mont. (Dec. '25) *Director '39–'42. M*

**Plunkett, Joseph A.,** Reservoir Attendant, 612 Ridge Rd., Cedar Grove, N.J. (Jan. '43)

**Pohl, Charles A.,** Bogart & Pohl, Engrs., 39 Cortlandt St., New York 7, N.Y. (Jan. '43)

**Pohl, John A.,** Eng. Draftsman, Bureau of Water Works & Supply, 3817 Sheffield Ave., Los Angeles, Calif. (Apr. '38)

**Pointer, William W.,** Supt. & Gen. Mgr., City Light, Water & Gas Dept., Troy, Ala. (Apr. '29) *M*

**Poisson, L. Lionel,** Chemist, Water Works Dept., 134 St. Maurice, Trois-Rivieres, Que., Can. (Jan. '43)

**Poling, C. A.,** Asst. Water Sales Agent, Los Angeles Dept. of Water & Power, 10411 Camarillo St., North Hollywood, Calif. (Oct. '34)

**Polk, Wesley W.,** Chief Highway Engr., State of Illinois, 422 Centennial Bldg., Springfield, Ill. (Mar. '26) *AM*

**Pollard, Joseph G., Co., Inc.,** R. T. Mitchell, Pres., 142 Ashland Pl., Brooklyn 1, N.Y. (Assoc. M. Apr. '26)

**Pollock, L. V.,** Resident Engr., Birmingham Water Works Co., Birmingham 3, Ala. (July '39) *M*

**Pollock, T. H.,** Supt., Plattsmouth Water Corp., 130 N. 6th St., Plattsmouth, Neb. (June '40)

**Pomeroy, Richard,** Cons. Chemist, Montgomery & Pomeroy, 117 E. Colorado St., Pasadena 1, Calif. (Oct. '43) *P*

**Pomfret, Nelson A.,** Watershed Supervisor, North Jersey Dist. Water Supply Com., Wanaque, N.J. (Oct. '40)

**Pomona Pump Co. Div.,** Joshua Hendy Iron Works, Sunnyvale, Calif. (Assoc. M. May '27)

**Pomona Water Dept.,** F. C. Froehde, Mgr., City Hall, Pomona, Calif. (Corp. M. Oct. '43)

**Ponce M., Modesto,** Chief Engr., International Water Co., Apartado 630, Quito, Ecuador, S.A. (Jan. '44)

**Pons, Frank W.,** *see* Valdese Water Works

**Poole, B. A.,** State San. Engr., State Board of Health, 1098 W. Michigan Ave., Indianapolis, Ind. (Jan. '35) *Fuller Award '42. P* ★

**Poole, George J.,** Supt. of Pumping Stations, Water Dept., 3855 Emerson Ave., N., Minneapolis 12, Minn. (June '30) *M*

**Pope, B. L.,** Supt. of Public Works, Newton, N.C. (Oct. '42) *M*

**Port Hope Water Works Com.,** George W. Garnett, Chairman, Port Hope, Ont., Can. (Corp. M. Mar. '29)

**Portal, Primitivo,** Water Works Engr., Edificio Bacardi No. 214–215, Havana, Cuba (July '43)

**Porter, D. P.,** Supt. of Water Works, 1305 E. 4th St., Pueblo, Colo. (Sept. '16) *Director '30–'31. Fuller Award '43.*

**Porter, F. B.,** Pres., Southwestern Labs., Box 1379, Fort Worth 1, Tex. (June '30) *P*

**Porter, Fred S.,** Div. Engr., Long Beach Water Dept., 3939 Myrtle Ave., Long Beach 7, Calif. (Oct. '32) *M*

**Porter, Harry,** Dist. Mgr., Peoples Water Service Co., Bastrop, La. (Oct. '42)

**Porter, S. J.,** 345 Vermont St., San Francisco 3, Calif. (Oct. '37)

**Portland Bureau of Water Works,** Dorothy McCulloch Lee, City Comr., 314 City Hall, Portland, Ore. (Corp. M. Apr. '38)

**Portland Cement Assn.,** W. F. Tempest, Repr., Highways & Munic. Bureau, 33 W. Grand Ave., Chicago 10, Ill. (Assoc. M. Oct. '37)

**Porzelius, A. F.,** Mgr., City Water Co., Chattanooga 2, Tenn. (July '20) *Trustee '30. Director '30–'32. M*

**Poston, R. F.,** Director, Div. of San. Eng. & Sanitation, State Dept. of Public Health, Box 711, Santa Fe, N.M. (Jan. '43) *P*

**Potter, H. N.,** Chem. Engr., Dearborn Chemical Co., Ltd., 2454-64 Dundas St., W., Toronto 9, Ont., Can. (Apr. '39) ★

**Potter, Howard H.,** San. Engr., U.S. Public Health Service, Office of Civilian Defense, 17 Court St., Boston, Mass. (Jan. '40)

**Potter, James T.,** Chem. Engr., 314 Wilder Bldg., Charlotte 2, N.C. (Jan. '39) *P*

**Potter, Philip A.,** Water Engr., State Board of Public Utility Comrs., 1060 Broad St., Newark 2, N.J. (July '43) *M*

**Potter, Walter,** Engr., c/o Vincent Potter, 34 Middaugh St., Somerville, N.J. (Jan. '43)

**Potts, Clyde,** Civ. & San. Engr., 30 Church St., New York 7, N.Y. (July '06) *A*

**Potts, H. G.,** 219 Elm St., Wyandotte, Mich. (Jan. '38)

**Poughkeepsie Board of Public Works,** Eastman Park, Poughkeepsie, N.Y. (Corp. M. Dec. '12)

**Poulter, A. F.,** Engr. (R) State Board of Health, Oregon Bldg., Portland 4, Ore. (Jan. '37) *MP*

**Powell, Alexander C.,** 136 Grant St., Bangor, Me. (Mar. '10)

**Powell, E. W.,** Supt. of Water Dept. & City Engr., Concordia, Kan. (Jan. '42)

**Powell, Henry T.,** *see* Henderson Water Works

**Powell, John Giles,** Gore & Storrie, Cons. Engrs., 1130 Bay St., Toronto, Ont., Can. (Apr. '44) *P*

**Powell, Sheppard T.,** Cons. Chem. Engr., 330 N. Charles St., Baltimore 1, Md. (July '06) *P*

**Powell, W. L.,** Powell & Powell, Engrs., 2022 Republic Bank Bldg., Dallas 1, Tex. (Jan. '36) *MP* ★

**Powers, E. C.,** Lime Sales Mgr., The Marble Cliff Quarries Co., 8 E. Long St., Columbus 15, Ohio (July '42) *P*

**Powers, Leonard T.,** Supt., Water & Light Dept., East Grand Forks, Minn. (Apr. '40) *P*

**Powers, Newton W.,** Electrician, Filtration Plant, Dept. of Water Supply, Water Works Park, Detroit 14, Mich. (Apr. '40)

**Pracy, Geo. Wesley,** Supt., San Francisco Water Dept., 425 Mason St., San Francisco 2, Calif. (May '15) *Trustee '28–'30. President '33. Director '34. Fuller Award '44.*

**Prather, Willie B.,** Supt. of Water Works, Madison, Ind. (Jan. '44)

**Pratt, Gilbert H.,** Wallace & Tiernan Co., Inc., 346A Newbury St., Boston 15, Mass. (June '16) *MP*

**Pratt, H. R.,** Dist. Mgr., Klenzade Products, Inc., 5861 W. Ogden Ave., Chicago 50, Ill. (Dec. '43) *P*

**Pratt, Jack W.,** c/o C. L. Pratt, 1425 Santa Ynez Way, Sacramento, Calif. (Jan. '41) ★

**Pratt, S. W.,** *see* Seneca Falls Water Dept.

**Pray, John W.,** Mgr., Munic. Utilities, Ft. Dodge, Iowa (June '13) *Fuller Award '39.*

**Preble Water Dept.,** Clyde F. Cormier, Supt., 1817 Deckner Ave., R. No. 2, Green Bay, Wis. (Corp. M. Apr. '43)

**Prehn, Louis E.,** Supt., Water Dept., 7541 Franklin St., Forest Park, Ill. (July '44)

**Preload Co., The,** James R. White, 420 Lexington Ave., New York 17, N.Y. (Assoc. M. July '43)

**Preston, A. E.,** Mech. Foreman, Metropolitan Water Dist., 2510—4th St., La Verne, Calif. (Oct. '43)

**Preston, J. E.,** Member of Board, Dept. of Water & Sewers, Box 551, Miami 4, Fla. (Apr. '42) *P*

**Preston Light & Water Com. on Public Utilities,** W. E. Swartz, Supt., 833 King St., Preston, Ont., Can. (Corp. M. Jan. '38)

**Prewitt, T. H.,** Plant Supt., Missouri Water Co., Lexington, Mo. (Jan. '43)

**Price, Albert E.,** Asst. Supply Supt., Div. of Water, Box 1080, Norfolk, Va. (Oct. '43)

**Price, H. Arthur,** Asst. Specification Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34)

**Price, Norman,** Gen. Foreman, Repair & Meter Service, Rochester Water Works, Dewey Ave. & Bloss St., Rochester, N.Y. (July '35)

**Price, Philip G.,** Salesman, A. P. Smith Mfg. Co., 7 S. Dearborn St., Chicago 3, Ill. (Apr. '43) *M*

**Price, R. H.,** *see* Pan American Refining Corp.

**Price, Roy E.,** Supt. of Filtration, Water Works, 57 Wing St., Newark, Ohio (July '44)

**Prickett, Delbert,** Water & Sewer Supt., City Hall, Elma, Wash. (Apr. '44) *P*

**Priester, Max U.,** Chem. Engr., Cons. Div., W. H. & L. D. Betz, Gillingham & Worth Sts., Philadelphia 24, Pa. (Jan. '44) *P*

**Princeton Water Dept.,** J. E. Everson, Supt., Water & Light Dept., City Hall, Princeton, Ill. (Corp.M. Apr. '42)

**Prindle, George B.,** Supt. of Water Works, 374 Oakland Drive, Highland Park, Ill. (Mar. '24) *P*

**Pringle, H. L.,** *see* Whitby Public Utility Com.

**Pringle, J. T.,** Supt., Stamford Water Works, 981 Drummond Rd., Niagara Falls, Ont., Can. (Apr. '25) *AMP*

**Prior, John C.,** Prof. of San. Eng., Brown Hall, Ohio State Univ., Columbus 1, Ohio (Oct. '26) *MP*

**Pritchard, John C.,** 5137 Waterman Ave., St. Louis 8, Mo. (Feb. '26) *P* ★

**Pritchard, W. H.,** Master Mechanic, Hollinger Consolidated Gold Mines, Ltd., Timmins, Ont., Can. (July '44)

**Proctor, Edward M.,** Cons. Engr., 177 Inglewood Drive, Toronto 5, Ont., Can. (May '21)

**Prodanovich, Danilo,** 1st Lt., C.E., 87 Walton St., Atlanta, Ga. (Jan. '44) *AMP* ★

**Proportioneers, Inc.,** R. P. Lowe, Pres., 9 Codding St., Providence 1, R.I. (Assoc. M. Apr. '39)

**Propst, J. M.,** 500 S. Hamilton St., Neosho, Mo. (Jan. '36)

**Proulx, Georges,** City Engr., Chicoutimi, Que., Can. (Oct. '41)

**Providence Water Supply Board,** Philip J. Holton Jr., Supt., 161 Fountain St., Providence 3, R.I. (Corp. M. Oct. '34)

**Provost, Andrew J., Jr.,** Box 216 Noroton, Conn. (May '08) *P*

**Proximity Mfg. Co.,** J. D. McConnell, Water Dept., Denim Branch, Greensboro, N.C. (Corp. M. July '43)

**Public Works Magazine,** 310 E. 45th St., New York 17, N.Y. (Assoc. M. May '18)

**Publicker Commercial Alcohol Co.,** Joseph Greenblatt, Hydr. Engr., 1429 Walnut St., Philadelphia, Pa. (Corp. M. Apr. '44)

**Puckhaber, Fred H.,** Engr., Wallace & Tiernan Co., Inc., 1112 Liberty Bank Bldg., Dallas 1, Tex. (Apr. '38) *P*

**Puente, Manuel J.,** Cons. Engr., Box 898, Havana, Cuba (Jan. '36) *AM*

**Pulis, Milton G.,** Supt., Water Dept., Oakland, N.J. (Jan. '44)

**Pulp and Paper Industry,** *see* Technical Assn.

**Purcell, Hugh G.,** Mgr., Hugh G. Purcell Co., 304 Colman Bldg., Seattle, Wash. (Jan. '28)

**Purcell, James L.,** Supervisor, Sewage Disposal Plant, Eclipse Pioneer Div., Bendix Aviation Corp., Teterboro, N.J. (Apr. '43)

**Purcell, Lee T.,** Analyst & San. Engr., North Jersey Dist. Water Supply Com., Wanaque, N.J. (Jan. '31)

**Purdom, Paul W.,** Sr. Engr., Dept. of Public Health, 2115 Abbott Martin Road, Nashville 5, Tenn. (Jan. '44) *P*

**Purdy, Alvin C.,** Cons. Chemist, Bull & Roberts, 117 Liberty St., New York 6, N.Y. (Jan. '41)

**Pure Water Co., Inc.,** V. J. Ferzacca, Gen. Supt., Logan, W.Va. (Corp. M. July '40)

**Purity Springs Water Co.,** G. B. Warner, Gen. Mgr., Box 30, Tampa, Fla. (Corp. M. July '35)

**Purser, John R., Jr.,** Treas., J. R. Purser Sales Engineering, Inc., 816 Independence Bldg., Charlotte 2, N.C. (Oct. '39) *P*

**Pyle, Fred D.,** *see* San Diego Water Dept.

**Qualkenbush, Raymond L.,** Water Service Foreman, C. I. & L. Ry., Monon, Ind. (Affil. Oct. '41)

**Quandt, Charles H.,** Quandt Pumping Station, Route 1, Box 150, Torrance, Calif. (Jan. '36) *M*

**Quebec Public Service Board,** Gustave St. Jacques, Courthouse, Quebec, Que., Can. (Corp. M. Apr. '41)

**Quigley Co., Inc.,** I. A. Pfeil, 527—5th Ave., New York 17, N.Y. (Assoc. M. Oct. '35)

**Quigley, T. T.,** San. Engr., Wallace & Tiernan Co., Inc., Box 178, Newark 1, N.J. (Oct. '37) *P*

**Quilty, Patrick,** Comr., Dept. of Water Supply, Gas & Electricity, 2360 Municipal Bldg., New York 7, N.Y. (May '30)

**Quimby, Frank K.,** 2135 Ridge Ave., Evanston, Ill. (July '30)

**Quincy Water Works Com.,** Orville J. Smith, 415 Hampshire St., Quincy, Ill. (Corp. M. Apr. '27)

**Quinn, John J.,** Chief Chemist, Knoxville Water Bureau, 2915 McCalla Ave., Knoxville, Tenn. (May '30) *Director '35–'38.*

**Quinn, Joseph L., Jr.,** Acting Director, Div. of Environmental Sanitation, State Board of Health, 1098 W. Michigan St., Indianapolis 7, Ind. (Oct. '41)

**Quinn, R. J.,** *see* Mathieson Alkali Works, Inc.

**Quinnell, Fred,** City Mgr., City Hall, Bozeman, Mont. (Feb. '22)

**Quirk, M. Edward,** Foreman, Water Dept., 38 Sutton St., Peabody, Mass. (Apr. '37)

**Raab, Frank,** Sr. Chemist & Bacteriologist, Fridley Softening Plant, Minneapolis 13, Minn. (Oct. '21) *P*

**Rackham, William J.,** Asst. Supt., Water Works Dept., Municipal Bldg., Ogden, Utah (Jan. '44) *M*

**Radcliffe, Dewey M.,** Resident Engr., Washington Aqueduct, U.S. Engr. Office, 1st & Douglas Sts., Washington 25, D.C. (Jan. '41) *MP* ★

**Radcliffe, John L.,** Chemist, Elizabethtown Water Co., Cons., 535 Trotter Lane, Elizabeth 3, N.J. (Feb. '20) *P*

**Rainey, Clarence M.,** Water Supt., 735 W. Bonneville St., Pocatello, Idaho (Nov. '27)

**Raleigh Water Dept.,** E. M. Johnson, Supt., City Hall, Raleigh, N.C. (Corp. M. Oct. '40)

**Ralls, W. E.,** Supt., Trenton Munic. Utilities, Trenton, Mo. (Apr. '39)

**Rammer, H. L.,** Chief Chemist, Lab., Fibreboard Products, Inc., Stockton, Calif. (Oct. '39)

**Ramp, Louis C.,** *see* Rensselaer Water & Light Dept.

**Ramseier, R. E.,** 2811 Parker St., Berkeley 4, Calif. (Apr. '39)

**Ramsey, Ernest A.,** *see* Florida Keys Aqueduct Com.

**Ramsey Water Works,** F. D. Haring, Chairman, Water Com., 33 N. Central Ave., Ramsey, N.J. (Corp. M. July '35)

**Randall, C. C.,** Supt., Lincolnton Water Dept., Lincolnton, N.C. (July '37)

**Randall, William Thomas,** Neptune Meters, Ltd., Long Branch, Ont., Can. (Jan. '38)

**Randle, Harold,** Engr., Calgary Power Co., Ltd., 504 Insurance Exchange Bldg., Calgary, Alta., Can. (Apr. '42) *MP*

**Randle, M. B.,** Cities Supply Co., Sumter, S.C. (July '35) *M*

**Randleman, City of,** G. P. Upton, Supt. of Water Works, Randleman, N.C. (Corp. M. Oct. '42)

**Randlett, Fred Morse,** Vice-Pres. & Gen. Mgr., Robert W. Hunt Co., 175 W. Blvd., Chicago 4, Ill. (June '20) *Trustee '25–'27.*

**Randorf, A. P.,** Charles A. Randorf Co., 220 Delaware Ave., Buffalo, N.Y. (Apr. '41) ★

**Rankin, Clint B.,** Comr. of Water, 112 W. 7th St., Pittsburg, Kan. (July '44) *P*

**Rankin, R. S.,** The Dorr Co., 570 Lexington Ave., New York 22, N.Y. (Apr. '40)

**Ranney Water Collector Corp. of New York,** Eugene W. Silitch, Mng. Director, 1510 Heyburn Bldg., Louisville, Ky. (Assoc. M. July '42)

**Ransom, Alfred E.,** Supt., City Water Works, City Hall, Canton 2, Ohio (Apr. '43) *M*

**Ratcliffe, Robert C.,** 616 Ivinson Ave., Laramie, Wyo. (Jan. '37) *MP*

**Ratliffe, Clyde,** Plant Supt., Water Dept., Wadesboro, N.C. (Apr. '40)

**Rau, William J.,** 115 Marshall Ave., Floral Park, N.Y. (Jan. '36)

**Rausch, E. B.,** *see* American Well Works, Inc.

**Ravenscroft, Chester A.,** Sr. Water Works Operator, Post Engr., Box 2797, Fort Douglas, Utah (July '43) *P*

**Rawlins, George S.,** Exec. Vice-Pres., J. N. Pease & Co., Inc., Johnston Bldg., Charlotte 2, N.C. (Oct. '39) *P*

**Rawn, A. M.,** Engr. & Gen. Mgr., Los Angeles County Sanitation Dist., 110 S. Broadway, Los Angeles 12, Calif. (Oct. '34)

**Ray, Marvin E.,** Asst. City Engr., Municipal Bldg., Vancouver, Wash. (Apr. '44) *M*

**Read, A. W.,** Supt., Water Dept., Bangor, Me. (July '35)

**Read, Daniel,** Secy.-Treas., East Bay Munic. Utility Dist., Box 720, Oakland 4, Calif. (Oct. '39) *A*

**Read, C. S.,** *see* Tuscaloosa, City of

**Read, Miles H.,** Asst. Engr., Simplex Valve & Meter Co., 68th & Upland Sts., Philadelphia, Pa. (Apr. '30)

**Reading Bureau of Water,** 207 City Hall, Reading, Pa. (Corp. M. Mar. '16)

**Reager, John J.,** Supt. & Engr., Perth Amboy Water Works, City Hall, Perth Amboy, N.J.. (Jan. '37)

**Rearick, C. Foster,** Utility Supt., Water Dept., Walkerton, Ind. (Jan. '43)

**Rebsamen, Lloyd M.,** Mgr., City Water & Light Plant, Jonesboro, Ark. (Jan. '34) *AMP*

**Red Hed Mfg. Co.,** 368 Congress St., Boston 10, Mass. (Assoc. M. Apr. '39)

**Red Wing Board of Water Comrs.,** H. E. Nordholm, Clerk, City Hall, Red Wing, Minn. (Corp. M. Apr. '42)

**Redding, G. H.,** *see* Massey Concrete Products Co.

**Redding, Harry P.,** Durham Water Dept., No. 9 Glenn Apts., Durham, N.C. (Oct. '39) *P*

**Redfern, W. Blaine,** James, Proctor & Redfern, 1004 Exchange Life Bldg., 36 Toronto St., Toronto 2, Ont., Can. (Nov. '19)

**Redington, H. R.,** National Tube Co., 621 Frick Bldg., Box 266, Pittsburgh 30, Pa. (Apr. '40)

**Redman, Rollin,** Supt., Water Works, Fort Branch, Ind. (Jan. '44) *M*

**Reece, Howell,** Illinois Athletic Club, 112 S. Michigan Ave., Chicago, Ill. (Oct. '38) ★

**Reed, Allen M.,** Chemist, Wright Aeronautical Co., 2250 Cathedral Ave., Norwood 12, Ohio (Apr. '44)

**Reed, Clarence H.,** Asst. San. Engr., Metropolitan Water Works, Framingham, Mass. (May '30)

**Reed, I. H.,** Pres. & Mgr., Sedalia Water Co., 111 W. 4th St., Sedalia, Mo. (Jan. '39) *AMP*

**Reed, Paul W.,** Asst. Engr., Bureau of San. Eng., State Board of Health, 1098 W. Michigan St., Indianapolis, Ind. (Apr. '40) ★

**Reed, Ralph E.,** Supt. of Maint. & Constr., 867 S. Detroit Ave., Toledo 9, Ohio (July '44)

**Reed, Ramsey M.,** Sales Engr., U.S. Pipe & Foundry Co., 1711 First National Bldg., Birmingham 3, Ala. (July '43) *P*

**Reemelin, O. B.,** Vice-Pres., Dayton Power & Light Co., 25 N. Main St., Dayton 1, Ohio (July '40) *AMP*

**Reep, E. P.,** Chemist, Water Works Dept., Girard, Ohio (July '35)

**Rees, Rhea,** Supt., Water Dept., City Hall, Sioux Falls, S.D. (Jan. '39) *AMP*

**Reeves, Walter Louis,** Chemist, Water Dept., 405 Magnolia St., Tampa 6, Fla. (Jan. '43) *P*

**Reeves, William F.,** Asst. Supervisor of Water Supply, Water Works, 4946 Western Hills Ave., Cincinnati 5, Ohio (Jan. '44) *M*

**Refinite Corp., The,** C. W. Woods, Refinite Bldg., Omaha, Neb. (Assoc. M. Apr. '32)

**Regan, J. F.,** Plumbing & Heating Engr., 11 S. 9th St., Miles City, Mont. (Jan. '44)

**Regester, Robert T.,** Cons. Engr., 214 Baltimore Life Bldg., Baltimore 1, Md. (July '35) *P*

**Regina Water Works Dept.,** J. W. D. Farrell, Supt., City Hall, Regina, Sask., Can. (Corp. M. Apr. '24)

**Regnier, R. C.,** Asst. Chief, Civ. Eng. Sec., Chief, Water Supply Sec., Chemical Warfare Service, U.S. Army, Huntsville Arsenal, Ala. (Jan. '42) ★

**Reichardt, H. G.,** Supt., City Water Dept., Watertown, Wis. (Oct. '31) *M*

**Reichman, Irving,** Inspector of Water Consumption, Dept. of Water Supply, Gas & Electricity, New York, N.Y. (Apr. '44) *MP*

**Reid, G. G.,** Cons. Engr., 7 Edmund Ave., Toronto 5, Ont., Can. (July '41)

**Reid, George W.,** Asst. Prof., Hydr. Lab., College of Eng., Gainesville, Fla. (Jan. '44) *P*

**Reiff, Andrews S.,** *see* Hastings Board of Public Works

**Reighard, Claude L.,** Supt. of Water Purif., Monroe Water Dept., 523 E. 6th St., Monroe, Mich. (Jan. '41)

**Reilly, Raymond T.,** Gen. Mgr., Conley Frog & Switch Co., Memphis, Tenn. (July '35)

**Reilly Tar & Chemical Corp.,** William Higburg, 1615 Merchants Bank Bldg., Indianapolis 4, Ind. (Assoc. M. Jan. '36)

**Reily, James S.,** Comr. of Public Utilities, Shreveport, La. (July '40)

**Reiman, Walter A.,** Chief San. Engr., State Board of Health, State Health Dept. Bldg., Little Rock, Ark. (July '42) *MP*

**Reinert, Donald F., Jr.,** San. Engr., Bureau of Eng., Dept. of Public Works, 7958 S. Justine St., Chicago 20, Ill. (July '43) *P*

**Reinhardt, Arthur W.,** Asst. San. Engr., Bureau of San. Eng., 1561 Euclid Ave., Berkeley 8, Calif. (Jan. '43) *P*

**Reinhardt, Harry,** Vice-Pres., California Water & Telephone Co., 300 Montgomery St., San Francisco 4, Calif. (Apr. '31) *M*

**Reinicker, L. T.,** Vice-Pres., Riverton-Palmyra Water Co., Morgan & Bank Aves., Palmyra, N.J. (June '29)

**Reinke, Edward A.,** Sr. San. Engr., Bureau of San. Eng., 15 Shattuck Sq., Berkeley 4, Calif. (Nov. '23) *P*

**Reliable Iron Foundry, Inc.,** 1583 Fishburn St., Los Angeles 33, Calif. (Assoc. M. July '34)

**Remington Arms Co., Inc.,** Lake City Ordnance Plant, H. W. Staley, Water Plant Bldg. 16, Independence, Mo. (Corp. M. Jan. '42)

**Rener, Alexander C.,** Water Works Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (July '43) *M*

**Renfro, James Rolin,** Mech. Engr., City of Corpus Christi, Box 1995, Corpus Christi, Tex. (Jan. '44) *A*

**Renshaw, William C.,** Asst. Engr., Water Dept., 86 Inverness Drive, San Francisco, Calif. (Nov. '33) ★

**Rensselaer Valve Co.,** Troy, N.Y. (Assoc. M. May '90)

**Rensselaer Water & Light Dept.,** Louis C. Ramp, Supt., Rensselaer, Ind. (Corp. M. July '43)

**Renton, City of,** James E. Morrison, Supt. of Utilities, City Hall, Renton, Wash. (Corp. M. Jan. '44)

**Reny, Fred J.,** Treas. & Gen. Mgr., Portland Water Dist., 16 Casco St., Portland 2, Me. (Jan. '42) *M*

**Republic Steel Corp.,** Commercial Research Div., Republic Bldg., Cleveland 1, Ohio (Assoc. M. Apr. '32)

**Requardt, Gustav J.,** Whitman, Requardt & Assoc., Engrs., 1304 St. Paul St., Baltimore 2, Md. (May '23) *M*

**Rettig, G. J.,** Asst. Engr., Alvord, Burdick & Howson, 20 N. Wacker Drive, Chicago 6, Ill. (Oct. '41) *P*

**Revelle, J. E.,** c/o H. E. Pease, 4013 Vinceton St., Pittsburgh, Pa. (Apr. '40) ★

**Revere Copper & Brass, Inc.,** W. Weir Henry, Asst. Sales Mgr., 230 Park Ave., New York 17, N.Y. (Assoc. M. Aug. '28)

**Rew, Myron E.,** Asst. San. Engr., 12th Naval Dist., 214 E.M.L., Univ. of California, Berkeley, Calif. (Jan. '44)

**Reynolds, Albert H.,** Directing Chemist, Dearborn Labs., 1029 W. 35th St., Chicago 9, Ill. (Dec. '29)

**Reynolds, Earl T.,** Supt., Oxford Light & Water Co., Oxford, Ind. (Affil. Jan. '41)

**Reynolds, Frank H.,** 403 Volunteer Bldg., Atlanta 3, Ga. (July '35)

**Reynolds, James H.,** Asst. Supt., Lowell Water Works, City Hall, Lowell, Mass. (Jan. '36)

**Reynolds, Leon B.,** Prof., Hydr. & San. Eng., Stanford University, Calif. (Nov. '28) *P*

**Reynolds, M. W.,** Supt., City Water Dept., Durand, Mich. (July '39)

**Reynolds, Otto S.,** Water Works Engr., 6220 Harrison St., Kansas City 4, Mo. (Aug. '27)

**Reynolds, R. W.,** *see* West Palm Beach Water Co.

**Rheem Mfg. Co.,** R. M. Thomas, Director, Research Div., 1209 E. 25th St., Baltimore 18, Md. (Corp. M. Apr. '43)

**Rhoades, Oliver S.,** Garage Foreman, Water Works, 565 Johnston St., Akron, Ohio (Affil. July '44)

**Rhoads, A. L.,** Supt., West Virginia Water Service Co., Bluefield, W.Va. (May '26) *M*

**Rhoads, G. A.,** Mgr., Safford Munic. Utilities, Safford, Ariz. (Apr. '41) *M*

**Rhodes, Fred,** Director of Public Works, San Diego 1, Calif. (Oct. '34) *M*

**Rhynus, C. P.,** Box 766, Poughkeepsie, N.Y. (May '12) *MP*

**Rian, John,** Dist. Supt., Northern Indiana Public Service Co., 526 Franklin St., Michigan City, Ind. (Affil. Jan.'41)

**Ribner, Morris,** 1st Lt., Sn.C., APO 647, c/o Postmaster, New York, N.Y. (July '43) ★

**Rice, A. J.,** *see* Carolina Aluminum Co.

**Rice, Archie H.,** 3244 N.E. 15th Ave., Portland, Ore. (Jan. '42) *M* ★

**Rice, B. P.,** Supervising Engr., Reconstruction Finance Corp., Bond Service Div., Atlanta, Ga. (Apr. '37) *Fuller Award '43.*

**Rice, Clifton L.,** Sr. Operating Engr., Post Engrs., Morrison Field, 714 Claremore Drive, West Palm Beach, Fla. (July '44)

**Rice, Cyrus Wm.,** Pres., Cyrus Wm. Rice Co., Inc., 17 Noble Ave., Pittsburgh 5, Pa. (Oct. '24) *P*

**Rice, Ernest G.,** Civ. Engr., 3445 N.E. Multnomah St., Portland 13, Ore. (Oct. '42) *MP*

**Rice, Homer D.,** Asst. Gen. Mgr., New York Fire Insurance Rating Organization, 85 John St., New York 7, N.Y. (Apr. '37)

**Rice, Hugh B.,** 630 Ross Rd., Lexington, Va. (June '34) ★

**Rice, John M.,** Cons. Engr., Century Bldg., Pittsburgh 22, Pa. (June '21) *MP*

**Rice, Owen,** Hall Labs., Inc., 323 Fourth Ave., Pittsburgh 22, Pa. (Apr. '37) *P*

**Rice, W. H.,** Supt. of Bldgs. & Grounds, Morehead State Teachers College, Morehead, Ky. (July '41) *M*

**Rich, Edward D.,** Deputy Director, Bureau of Eng., Michigan Dept. of Health, Lansing 4, Mich. (Jan. '39) *Fuller Award '43.*

**Rich Mfg. Co., Ltd.,** E. F. Alt, Sales Mgr., 3851 Santa Fe Ave., Los Angeles, Calif. (Assoc. M. Sept. '27)

**Rich, P. D.,** West Bainbridge Water Works, Bainbridge, Ga. (July '43)

**Richards, E. D.,** Mgr., Valley Water Co., Box 56, La Canada, Calif. (July '36) *M*

**Richards, H. H.,** Supt., Industrial Chemical Sales Div., No. 1 Chemical Plant, Piedmont, W.Va. (Jan. '37)

**Richards, Robert B.,** 3043 N. 77th Ct., Elmwood Park, Ill. (Jan. '43)

**Richardson, Charles G.,** Vice-Pres., Builders-Providence, Inc., Providence 1, R.I. (July '20)

**Richardson, E. J.,** Operating Engr., Arkansas Munic. Water Co., 211 W. 5th Ave., Pine Bluff, Ark. (Jan. '43) *P*

**Richardson, E. W.,** Munic. Engr., Municipality of West Vancouver, 1109 Keith Rd., West Vancouver, B.C., Can. (Apr. '41) *P*

**Richardson, G. S.,** *see* Tilbury Public Utilities Com.

**Richardson, J. C.,** Supt. & Chief Chemist, Saginaw Filter Plant, Saginaw, Mich. (May '30) *P*

**Richardson, L. H.,** Territorial Service Engr., Johns-Manville Sales Corp., 10—17th St., N., Great Falls, Mont. (Apr. '43)

**Richardson, R. M.,** *see* Rubber Reserve Co.

**Richey, L. G.,** City Engr., Box 374, Belmont, N.C. (Oct. '41) ★

**Richheimer, Charles E.,** Cons. Engr., Box 4817, Jacksonville 1, Fla. (Jan. '37) *P*

**Richmond, E. A.,** *see* Alameda County Water Dist.

**Rickard, Grover E.,** Supt. of Water, 130 East St., Oneonta, N.Y. (June '26) *P*

**Rickenback, Howard F.,** *see* West Reading, Borough of

**Riddell, C. C.,** Supt., City Water Works, Raton, N.M. (July '35)

**Riddick, Thomas M.,** Cons. Engr. & Chemist, 369 E. 149th St., New York 55, N.Y. (Oct. '34)

**Ridenour, G. M.,** Assoc. Resident Lecturer, School of Public Health, Univ. of Michigan, Ann Arbor, Mich. (Jan. '41) *MP*

**Ridenour, Ralph O.,** Asst. Civ. Engr., 1039 Redondo Blvd., Los Angeles 35, Calif. (Apr. '38)

**Ridenour, W. E.,** Pres., Bird-Archer Co., 4337 N. American St., Philadelphia 40, Pa. (Dec. '28) *P*

**Rider, Ezra B.,** Engr., Metropolitan Water Dist., 306 W. Third St., Los Angeles 13, Calif. (Oct. '43) *M*

**Ridgely, Raymond G.,** City Mgr., Box 838, St. Petersburg, Fla. (Oct. '30)

**Ridgetown Public Utilities Com.,** J. Lightbody, Mgr., Ridgetown, Ont., Can. (Corp. M. Jan. '43)

**Ridgway, Paul Jay,** 316 Tower Bldg., Washington 5, D.C. (Apr. '43)

**Ridington, C. R.,** *see* Lansdale Munic. Authority

**Riedel, Carl Martin,** Chem. Engr., Chemical Soil Solidification Engineering, 8022 Paxton Ave., Chicago 17, Ill. (June '33)

**Riehl, Merrill L.,** 380 Garden Rd., Columbus 2, Ohio (Apr. '40) *P*

**Riggs, Charles H.,** 847 W. Jefferson St., Franklin, Ind. (Jan. '43) *MP*

**Rigling, Vance F.,** Chief Engr., Water Utilities Service Corp., Box 146, Lemoyne, Pa. (Apr. '43) *MP*

**Rihm, Alexander,** 8566—80th St., Woodhaven, N.Y. (July '43)

**Riker, I. Russell,** Engr., Boro Hall, Princeton, N.J. (Affil. Jan. '39) *P*

**Riley, Lester,** Supt., Sandwich East Township Utilities Com., Route 2, Tecumseh, Ont., Can. (Apr. '44)

**Riley, Robert F.,** Florida Dist. Mgr., Wailes Dove-Hermiston Corp., 309 N.W. 9th Ave., Miami 36, Fla. (July '43)

**Riley, Roy,** Supt., Water Works Dept., Bucyrus, Ohio (Apr. '44) *M*

**Rimbach, T. N.,** Sales Engr., The Permutit Co., 3903 Olive St., St. Louis 8, Mo. (Apr. '40) *P*

**Rimmer, James H.,** Asst. Supervisor, Water Distr., Cincinnati Water Works, City Hall, Cincinnati 2, Ohio (Apr. '40)

**Rimstidt, Wm. B.,** Supt., Greensburg Munic. Water Works, 116 W. Main St., Greensburg, Ind. (Jan. '43) *M*

**Rinbrand, Adam F.,** *see* Rinbrand Well Drilling Co., Inc.

**Rinbrand Well Drilling Co., Inc.,** Adam F. Rinbrand, Pres., 14 Waldron Ave., Glen Rock, N.J. (Assoc. M. Oct. '43)

**Rindelhardt, Karl F.,** Sr. Civ. Engr., Dept. of Water Supply, 706 Water Board Bldg., Detroit 26, Mich. (July '40) *M*

**Rinehard, C. M.,** *see* Hagerstown Water Dept.

**Ringer, Walter C., Jr.,** Asst. Chemist, Bureau of Water, 4517 Conshohocken Ave., Philadelphia 31, Pa. (Jan. '43) *MP*

**Riordan, John E.,** Supt. of Filtration, 14 Sunset Hill Ave., Norwalk, Conn. (Oct. '37)

**Ripple, Oliver J.,** Supt. of Filtration, R.F.D. No. 2, Littleton, Colo. (Jan. '30) *Director '40–'43. Fuller Award '42. P*

**Ritch, Paul E.,** Resident Engr., Los Angeles Dept. of Water & Power, Independence, Calif. (Oct. '34)

**Ritchie, E. G.,** 5 Lynedoch Ave., E. St. Kilda, S. 2, Melbourne, Australia (Sept. '12)

**Ritchie, R. E.,** Supt. of Water Dept., Harbor Beach, Mich. (Apr. '44) *P*

**Ritchie, Richard J.,** Chemist, Pepsi-Cola Co., 47-51—33rd St., Long Island City 1, N.Y. (Jan. '43)

**Ritter, Roy H.,** Assoc. Civ. Engr., Whitman, Requardt & Assoc., 1304 St. Paul St., Baltimore 2, Md. (July '43) *P*

**Ritzel, William J.,** Supt., Pasadena Water Dept., 1040 Manzanita St., Pasadena 3, Calif. (Oct. '38) *M*

**Riverside Water Dept.,** L. W. Grayson, Supt., Riverside, Calif. (Corp. M. July '26)

**Rix, Harlan C.,** 206 Russell St., Storm Lake, Iowa (July '42) ★

**Roahrig, Henry L.,** 454 Harrison St., West Chicago, Ill. (July '43)

**Robbins, Clyde,** *see* Delphi Water Works

**Robbins, Everitt,** Supt., Dept. of Water Works, 55 N. 1st St., Scottsburg, Ind. (July '37) *M*

**Robbins, George M.,** Sales Agent, U.S. Pipe & Foundry Co., 625 Plymouth Bldg., Minneapolis 2, Minn. (Oct. '39)

**Robbins, George T.,** Relief Operator, City Water & Sewage Plant, Box 53, Fort Lauderdale, Fla. (Jan. '44) *M*

**Robbins, James Melvin,** Assoc. Prof. of Civ. Eng., Newark College of Engineering, 367 High St., Newark 2, N.J. (Jan. '39) *P*

**Roberts, Alfred M.,** Pres., Wanakah Water Co., R.D. No. 3, Hamburg, N.Y. (July '25) *M*

**Roberts, Arthur, Jr.,** Chief Engr., Lynchburg Foundry Co., Lynchburg, Va. (Jan. '43)

**Roberts, E. A.,** City Clerk, Water Dept., Carlsbad, N.M. (Jan. '44) *A*

**Roberts, E. Fred,** E. F. Roberts & Co., Brantford, Ont., Can. (Jan. '38) *AMP*

**Roberts Filter Mfg. Co.,** J. A. Thomas, Gen. Mgr., Darby, Pa. (Assoc. M. Mar. '10)

**Roberts, H. G.,** Dist. Mgr., Rensselaer Valve Co., 411 Sharon Bldg., San Francisco 5, Calif. (Oct. '37)

**Roberts, James Moran,** Asst. Mgr., Munic. Eng. Dept., Robert & Co., Inc., 280 Lindbergh Drive, N.E., Atlanta, Ga. (Apr. '38) *P*

**Roberts, John S., Jr.,** Borough Engr., Bristol, Pa. (June '20)

**Robertson, William J.,** Chief Engr., Pumping Station, Water Dept., 2018 N.W. 17th St., Oklahoma City 6, Okla. (Oct. '43) *AM*

**Robie, Kenneth W.,** Asst. Supt., Brookline Water Dept., 20 Copley St., Brookline, Mass. (Jan. '42)

**Robinson, Delbert W.,** Water Works Engr., Community Public Service Co., Fort Worth 2, Tex. (Apr. '27)

**Robinson, H. C.,** *see* Dundas Public Utilities Com.

**Robinson, Hamilton E.,** City Engr., City Hall, Huntington Park, Calif. (Jan. '36)

**Robinson, J. Albert M.,** Cons. Engr., 228 N. La Salle St., Chicago 1, Ill. (Oct. '31) *P*

**Robinson, J. W.,** Gen. Mgr., County Water Dist., 216 N. Church St., Pico, Calif. (Apr. '36) *P*

**Robinson, John H.,** Supt., Concord Water & Sewer Dept., Town House, Concord, Mass. (Jan. '40)

**Robinson, T. C.,** Supt., Water & Light Dept., Granite Falls, N.C. (July '38)

**Robinson, T. M.,** Asst. Engr., Mahoning Valley Sanitary Dist., 328 Ferndale Ave., Youngstown 7, Ohio (July '43) *M*

**Robinson, Wm. E.,** Water Works Engr., Utility Bldg., Calgary, Alta., Can. (Feb. '30) *M*

**Roby, Richard Edward,** 735 Kinderkamack Rd., Riveredge, N.J. (Jr. M. Jan. '41) ★

**Rock, Harold F.,** Dist. San. Engr., State Dept. of Health, 16 Dietz St., Oneonta, N.Y. (Jan. '40) ★

**Rock Island Water Dept.,** Nicholas J. Hoeltzner, Supt. of Water Works, Rock Island, Ill. (Corp. M. Oct. '41)

**Rockaway Borough Water Dept.,** Floyd Hiler, Water Comr., 1 E. Main St., Rockaway, N.J. (Corp. M. Oct. '43)

**Rockwell, W. F., Jr.,** Vice-Pres., Pittsburgh Equitable Meter Co., 400 Lexington Ave., Pittsburgh 8, Pa. (Jan. '44)

**Rockwell, Willard F.,** Cons. Engr., Pittsburgh Equitable Meter Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. (Feb. '28)

**Rod, Mons,** City Water Supt., Kent, Wash. (Apr. '36) *M*

**Rodan, John T.,** 61 S. 27th St., Camden, N.J. (Affil. Jan. '39)

**Rode, Daniel,** Sr. Treatment Plant Operator, Water Dept., Fort Lauderdale, Fla. (July '43) *P*

**Roden, Carl C.,** James B. Clow & Sons, 2-269 General Motors Bldg., Detroit 2, Mich. (Jan. '38)

**Rodolf, Carl F.,** 37 Fairview Ave., Piedmont 10, Calif. (Jan. '43)

**Rodriguez P., Jesus A.,** Designing Engr., Ministerio de Obras Publicas, Avilanes a Mirador No. 59, Caracas, Venezuela, S.A. (Jan. '42)

**Roe, Frank C.,** San. Engr., The Carborundum Co., Perth Amboy, N.J. (Jan. '35) *P*

**Rogers, A. H.,** *see* Garden City, Inc. Village of

**Rogers, Edward J.,** Pres. & Gen. Mgr., Layne-Northwest Co., 709 N. 11th St., Milwaukee 3, Wis. (Jan. '42) *M*

**Rogers, J. H.,** *see* Creedmoor, Town of

**Rogers, Joseph H.,** Dist. Supt., Southern California Water Co., 5750 Gardendale Ave., Hollydale, Calif. (Oct. '43) *MP*

**Rogers, L. R.,** *see* Steel Protection & Chemical Co., Inc.

**Rogers, Lee,** Pres., Layne-Western Co. of Minnesota, 3140-48 Snelling Ave., Minneapolis 6, Minn. (Jan. '39)

**Rogers, M. W.,** Mgr., Public Utility Com., Box 387, Carleton Place, Ont., Can. (Mar. '27) *MP*

**Rogers, Milford E.,** *see* Wichita, City of

**Rogers, T. M.,** Supt., Easley, S.C. (July '35) *MP*

**Rohan, George J.,** Supt., Water Works, Drawer 449, Waco, Tex. (Jan. '35) *Director '39-'42.*

**Rohlich, Gerard A.,** Sr. San. Engr., Office of Chief Engrs., War Dept., Washington, D.C. (July '44) *P*

**Rohm, Noah,** Service Engr., The Barrett Div., 3746 E. 58th St., Maywood, Calif. (Jan. '40)

**Roig, J. M. Valdes,** Ave. de Belgica No. 258, Havana, Cuba (Apr. '39) *P*

**Roll, Adelbert H.,** Supt., Munic. Water Dept., 316 E. Main St., Chilton, Calumet County, Wis. (Apr. '43)

**Rollins, F. L.,** 540 Orchard Ave., Barberton, Ohio (Apr. '44) *MP* ★

**Rome Bureau of Water,** C. E. Rosenburgh, 110 W. Liberty St., Rome, N.Y. (Corp. M. Apr. '22)

**Rome, Robert,** Asst. City Engr., 5891 Alma Rd., Vancouver, B.C., Can. (Dec. '30)

**Romeiser, C. H.,** Supt., City Elec. & Water Dept., Auburn, Ind. (July '43)

**Romer, Harold,** c/o Block, 1317 E. 8th St., Brooklyn 30, N.Y. (Apr. '43) *MP* ★

**Romer, J. B.,** *see* Babcock & Wilcox Co.

**Romig, F. V.,** Mgr., Beall Pipe & Tank Corp., 1945 N. Columbia Blvd., Portland 3, Ore. (Jan. '35)

**Roob, F. H.,** Supt., Water & Light Dept., Columbus, Wis. (Jan. '41)

**Rooney, John T.,** Mgr., Monongahela Valley Water Co., Market St., Elizabeth, Pa. (Oct. '43)

**Roop, Ralph E.,** Supt., Water Dept., City Hall, Decatur, Ind. (Apr. '43) *M*

**Roos, Charles M.,** Mgr., East St. Louis & Interurban Water Co., East St. Louis, Ill. (May '13) *Fuller Award '38. M*

**Root, Darrell A.,** 202 Overland Ave., Grants Pass, Ore. (Apr. '42) ★

**Roper, Roswell M.,** Engr. & Gen. Mgr., Board of Water Comrs., East Orange, N.J. (May '19) *M*

**Roper, Thomas, Jr.,** *see* Carbide & Carbon Chemical Corp.

**Rosalini, Joseph,** Supt., Water Works, 123 High St., Highwood, Ill. (Apr. '44) *P*

**Rose, Joseph L.,** Comr. of Public Works, 2334 Cowper Ave., Evanston, Ill. (Jan. '42)

**Rosen, Milton,** Comr. of Public Works, Board of Water Comrs., City Hall, St. Paul, Minn. (Oct. '38)

**Rosenburgh, C. E.,** *see* Rome Bureau of Water

**Rosenthal, Helman,** Director, Dallas Labs., 2411 S. Harwood St., Dallas 1, Tex. (June '18) *P*

**Ross, A. W.,** Vice-Pres., Layne-New York Co., 246 Upper Mountain Ave., Montclair, N.J. (Jan. '36)

**Ross, Charles A.,** Supt., Water Dept., 620 Warwick Ave., Zanesville, Ohio (Apr. '43) ★

**Ross, H. S.,** Asst. Supt., Pasadena Water Dept., 1040 Manzanita St., Pasadena 3, Calif. (Oct. '42) *M*

**Ross, Herman M.,** Capt., Sn.C., Office of the Medical Inspector, Fort Francis, Warren, Wyo. (Affil. Jan. '43) ★

**Ross Valve Mfg. Co., Inc.,** William F. End, Treas., Oakwood Ave., Troy, N.Y. (Assoc. M. Apr. '91)

**Ross, W. H.,** Dist. Supt., Southern California Water Co., 214 E. Colden Ave., Los Angeles, Calif. (Jan. '40)

**Rossum, John R.,** San. Engr., California Water Service Co., 374 W. Santa Clara St., San Jose 8, Calif. (Jan. '41) *P*

**Rothchild, H. A.,** Research Library, Kimberly-Clark Corp., Kimberly, Wis. (Jan. '39)

**Rothe, H. S.,** 641 S. Seventh St., Gainesville, Fla. (Jan. '42) ★

**Rothman, Edwin,** Wallace & Tiernan Co., Inc., R.F.D. No. 4, Box 259, Bridgeport, Conn. (July '35)

**Rouses Point, Village of,** Board of Trustees, Alfred Aupry, Supt., Rouses Point, N.Y. (Corp. M. July '40)

**Routledge, George Graham,** Supt., Water Distr. Sec., The Glen, R.R. No. 3, King Township, Toronto, Ont., Can. (Mar. '19) *M*

**Roux, Maurice G.,** Lock Joint Pipe Co., East Orange, N.J. (May '33)

**Rowe, E. J.,** Supt., Water & Light Dept., Wellsville, N.Y. (June '21) *Fuller Award '44.*

**Rowley, Everett C.,** Asst. Engr., Long Island Water Corp., 337 Merrick Rd., Lynbrook, N.Y. (Feb. '34)

**Rowley, R. W.,** Technical Sales Repr., Cliffs Dow Chemical Co., Marquette, Mich. (July '37) ★

**Royce, William A.,** *see* Traverse City Iron Works

**Royer, R. Stuart,** Cons. Engr., 207 Exchange Bldg., Richmond, Va. (Oct. '37)

**R-S Products Corp.,** David W. Hopkins, Vice-Pres., 4530 Germantown Ave., Philadelphia 44, Pa. (Assoc. M. Jan. '44)

**Rubber Reserve Co.,** R. M. Richardson, c/o Carbide & Carbon Chemicals Corp., Louisville, Ky. (Corp. M. July '44)

**Rubbo, Jacob F.,** Supt. of Filtration, City Water Works, 524 Thistle Ave., Iron Mountain, Mich. (July '38) *P*

**Ruberoid Co., The,** Walter G. Cowan, Mgr., Eastern Div., 500 Fifth Ave., New York 18, N.Y. (Assoc. M. Apr. '41)

**Ruby, J. Edwin,** Engr., Ruby & Co., Madisonville, Ky. (Apr. '44)

**Ruck, Franklin,** Supervisor, Water Softener Dept., R.R. 3, Troy, Ohio (July '44)

**Ruckman, Chas. L.,** Asst. Supt., Meters & Services Div., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Dec. '32)

**Rudd, E. Irvine,** Chief Engr., Public Utilities Com., State Office Bldg., Hartford, Conn. (Jan. '38)

**Rudolfs, Willem,** New Jersey Agricultural Expt. Station, The Towers Bldg., New Brunswick, N.J. (Oct. '35) *P*

**Rudser, Marguerite S. (Mrs.),** 3007 Angus St., Los Angeles, Calif. (Oct. '35)

**Ruehl, Edward H.,** 902 Travelers Bldg., Richmond 19, Va. (July '35) *M*

**Ruehle, Ralph,** Meter Supt., Warren Township Water Dept., 8077 Cadillac St., Van Dyke, Mich. (July '42) *M*

**Ruff, Harold T.,** *see* Mead Corp.

**Rumball, A. E.,** *see* Clinton Public Utilities

**Rumberger, C. A.,** Supt., Citizens Water Service Co., 207 Spruce St., Philipsburg, Pa. (Sept. '31)

**Rumsey, A. W.,** Asst. Chemist, Board of Public Utilities, Kansas City 16, Kan. (Jan. '44) *P*

**Runyon, Fredrick O.,** Cons. Engr., Runyon & Carey, 33 Fulton St., Newark 2, N.J. (Apr. '36) *P*

**Rupp, Daniel H.,** Production Engr., Water Dept., City Hall, Topeka, Kan. (Oct. '22) *Fuller Award '44. P*

**Ruppert, Edwin L.,** Passed Asst. San. Engr. (R), U.S. Public Health Service, 1403 Smith Tower, Seattle 4, Wash. (Apr. '44)

**Ruscica, Samuel,** Gen. Mgr., Ruscica Bros., 25 Industrial St., Leaside 12, Ont., Can. (Apr. '44) *P*

**Rush, Karl K.,** Technical Director, Electric Chemical Co., 8001 Franklin Blvd., Cleveland 2, Ohio (Jan. '41) *P*

**Russell, Alexander,** 204 Triangle Bldg., Rochester 4, N.Y. (Sept. '27)

**Russell, D. A.,** Chief Chemist, Youngstown Sheet & Tube Co., Youngstown 1, Ohio (May '24) *P*

**Russell, J. Bernard,** Mgr. & Engr., City Water Works, 103 E. Montgomery St., Creston, Iowa (Jan. '42) *MP*

**Russell, J. P.,** Mng. Editor, *Water and Sewage,* 341 Church St., Toronto 2, Ont., Can. (Jan. '34)

**Russell, John K.,** Water Treatment Plant Operator, Engineering Dept., Willard State Hospital, Willard, Seneca County, N.Y. (Jan. '43) *P*

**Russell, Kenneth E.,** *see* Dalton Fire Dist.

**Russell, M. J.,** Civ. Engr. Assoc., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Apr. '36)

**Russell, Norman F. S.,** Pres., U.S. Pipe & Foundry Co., Drawer 306, Burlington, N.J. (Dec. '15)

**Russell, Robert E.,** *see* Hydraulic Supply Mfg. Co.

**Russell, Roscoe,** Supt., Water Dept., Municipal Bldg., Sherman, Tex. (Oct. '43)

**Russell, Sherman,** Maint. Mechanic, City Water Works, 1210 Hemphill Ave., N.W., Atlanta, Ga. (July '43) *P*

**Russell, William J.,** Supt., Water Dept., Benton Harbor, Mich. (Jan. '38)

**Russo, Louis,** Asst. Supt. of Water & Sewer Dept., Town of Greenburgh, 196 Gibson Ave., White Plains, N.Y. (Jan. '41) *M*

**Rusta Restor Div.,** The Johnston & Jennings Co., A. B. MacTaggart, Mgr., 862 Addison Rd., Cleveland 14, Ohio (Assoc. M. July '40)

**Ruston, G. H.,** Supt. of Water, Kenilworth Water Dept., Kenilworth, Ill. (Apr. '40)

**Ruth, Leo W.,** Box 563, Menlo Park, Calif. (Jan. '43) *P*

**Rutherford, Clyde, Jr.,** Box 1, Edinburg, Tex. (Jr. M. Jan. '44)

**Ryan, Daniel M.,** Supt., Water Dept., City Hall, Brockton 22, Mass. (July '42)

**Ryan, Ed. J.,** San. Inspector, North Jersey Dist. Water Supply Com., Wanaque, N.J. (Apr. '44)

**Ryan, Edmund J.,** San. Engr., War Dept., Headquarters, 7th Service Command, Omaha 2, Neb. (Jan. '43) *P*

**Ryle, John,** Supt., Passaic Dist., Passaic Valley Water Com., 145 Prospect St., Passaic, N.J. (Dec. '19) *M*

**Sack, A. G.,** Supt., Gillett Water & Sewer Com., Gillett, Wis. (July '43) *M*

**Sacramento Div. of Water,** Carl M. Hoskinson, Acting Supt., Sacramento 14, Calif. (Corp. M. Apr. '32)

**Sage, Howard D.,** Supt. of Water & Sewerage, 192 S. Main St., Mechanicville, N.Y. (Apr. '39)

**Sahnd, William,** Supervisor of Water Distr., Water Works Dept., 242 City Hall, Cincinnati 2, Ohio (Oct. '38) *M*

**Saindon, Homer C.,** Mgr., Radnor Water Dist., 2229 Nolensville Rd., Nashville 11, Tenn. (July '35)

**Saindon, P. C.,** Supt., 1st Suburban Water Utility Dist. of Davidson County, 2229 Nolensville Rd., Nashville 11, Tenn. (July '41)

**St. Clair, City of,** Garnet H. Campbell, Water Works Operator, 214 N. Riverside Ave., St. Clair, Mich. (Corp. M. Apr. '44)

**St. Jacques, Gustave,** *see* Quebec Public Service Board

**St. John, C. H.,** Box 1411, Pensacola, Fla. (Oct. '42)

**St. John, L. D.,** Chief Engr., Water Plant, Water Dept., 1st & Main Sts., Jacksonville, Fla. (Apr. '30)

**St. Marys Public Utilities Com.,** Wm. McKee, St. Marys, Ont., Can. (Corp. M. Nov. '19)

**St. Paul Board of Water Comrs.,** Wm. A. Parranto, Comr. of Public Utilities, St. Paul 2, Minn. (Corp. M. Apr. '29)

**St. Thomas Public Utilities Com.,** J. W. Peart, Gen. Mgr., 474 Talbot St., St. Thomas, Ont., Can. (Corp. M. Apr. '09)

**Salem Water Com.,** C. E. Guenther, Mgr., Box 190, Salem, Ore. (Corp. M. Jan. '40)

**Salem Water Dept.,** Supt., Municipal Bldg., Salem, N.J. (Corp. M. Apr. '39)

**Salina Water Dept.,** E. J. Allison, Supt., Salina, Kan. (Corp. M. Feb. '27)

**Salmond, K. J.,** *see Water & Sewage*

**Salomon, Herman,** *see* Salomon, L. A., & Bro.

**Salomon, L. A., & Bro.,** Herman Salomon, 216 Pearl St., New York 7, N.Y. (Assoc. M. Oct. '34)

**Salt Lake City Corp. Water Dept.,** H. K. Burton, Supt., Salt Lake City, Utah (Corp. M. Feb. '20)

**Salter, Fitzgerald,** Supt., City Water Works, Montgomery, Ala. (July '38)

**Sampson, George A.,** Cons. Engr., Weston & Sampson, 14 Beacon St., Boston 8, Mass. (Jan. '44) *P*

**Samson, R. A.,** Supt., Water Dept., Municipal Bldg., Brighton, Colo. (Jan. '44)

**Samuel, T. D., Jr.,** 442 W. 68th St., Kansas City 5, Mo. (Oct. '28)

**Samuel, Thos. D., III,** Resident Engr., Black & Veatch, 4706 Broadway, Kansas City 2, Mo. (July '44) *P*

**San Antonio City Water Board,** W. D. Masterson, Mgr., Box 2449, San Antonio 6, Tex. (Corp. M. Oct. '38)

**San Bernardino Board of Water Comrs.,** Bard Livingstone, Supt., 416 Third St., San Bernardino, Calif. (Corp. M. Nov. '33)

**San Bernardino County Flood Control Dist.,** R. V. Ward, Asst. Engr., 364 Mountain View Ave., San Bernardino, Calif. (Corp. M. July '42)

**San Diego Water Dept.,** Fred D. Pyle, Hydr. Engr., 268 Civic Center, San Diego 1, Calif. (Corp. M. Jan. '25)

**San Dimas-Charter Oak Domestic Water Co.,** J. R. Shoemaker, Mgr., San Dimas, Calif. (Corp. M. July '42)

**San Fernando Water Dept.,** Harry E. Waite, Supt., City Hall, San Fernando, Calif. (Corp. M. Jan. '36)

**San Francisco Water Dept.,** Nelson A. Eckart, Gen. Mgr. & Chief Engr., 425 Mason St., San Francisco 1, Calif. (Corp. M. Nov. '33)

**San Francisco,** *see also* Suburban Water Co.

**San Gabriel County Water Dist.,** 106 N. San Gabriel Blvd., San Gabriel, Calif. (Corp. M. Jan. '44)

**San Jose Water Works,** Ralph Elsman, Pres., 374 W. Santa Clara St., San Jose, Calif. (Corp. M. Apr. '13)

**Sanborn, James F.,** Cons. Engr., 101 Park Ave., New York 17, N.Y. (Aug. '21)

**Sanchez, Ricardo M.,** Gen. Inspector of San. Works, Ministry of Public Works, Junin 461, Magdalena del Mar, Lima, Peru, S.A. (Apr. '43)

**Sanchis, Joseph M.,** 2745 Medlow Ave., Los Angeles 41, Calif. (Oct. '34) *P* ★

**Sandbach, Harold,** Supt., Water Dept., Gary Div., Northern Indiana Public Service Co., 5th & Broadway, Gary, Ind. (July '35) *M*

**Sanders, John F.,** Supt., Boonville Water Dept., Box 178, Boonville, Mo. (Oct. '43) *M*

**Sanderson, A. U.,** Chief Engr. of Water Supply, Dept. of Works, City Hall, Toronto, Ont., Can. (June '20) *Director '31–'34. MP*

**Sandquist, Emil,** 533 Spruce St., Berkeley 7, Calif. (Jan. '27) *Director '33–'36.*

**Sangdahl, Geo. S.,** Mgr., Cleveland Office, Chicago Bridge & Iron Co., 45 Prospect Ave., W., Cleveland 15, Ohio (Apr. '36)

**Sangder, Otto H.,** Chem. Engr., Technical Dept., Rayonier, Inc., Grays Harbor Div., Hoquiam, Wash. (Jan. '43)

**Santa Ana Valley Irrigation Co.,** G. P. Allen, Secy.-Treas., 154 N. Glassell St., Orange, Calif. (Corp. M. Apr. '38)

**Santa Ana Water Dept.,** Otto R. Hahn, Water Comr., Santa Ana, Calif. (Corp. M. Oct. '37)

**Santa Barbara, City of,** Delbert D. Smith, Supt., Water Dept., City Hall, Santa Barbara, Calif. (Corp. M. Oct. '37)

**Santa Monica, City of,** W. W. Milliken, Comr. of Public Works, City Hall, Santa Monica, Calif. (Corp. M. June '26)

**Santana, Rogelio A.,** Calle 10, No. 207, Altos, Vedado, Havana, Cuba (Jan. '39)

**Santry, Israel Wootan, Jr.,** Asst. Prof., School of Eng., Southern Methodist Univ., Dallas 5, Tex. (Apr. '44) *P*

**Sargent, George Henry,** City Engr., La Grange, Ga. (Dec. '29) *M*

**Sassani, Michael J.,** Assoc. San. Engr., Bureau of Yards & Docks, U.S. Navy Dept., Washington 25, D.C. (July '44) *P*

**Saticoy Water Co.,** Louis G. Norton, Supt., Saticoy, Calif. (Corp. M. Apr. '43)

**Sattley, Bushrod,** Comr. of Public Property, 249 N. Witt St., Decatur, Ill. (Apr. '43)

**Sauereisen, C. Fred,** Pres., Sauereisen Cements Co., Sharpsburg Station, Pittsburgh 15, Pa. (Oct. '40)

**Saunders, Daniel J.,** Mgr. of Ind. Sales, The Permutit Co., 330 W. 42nd St., New York 18, N.Y. (Apr. '37) *P*

**Saunders, Max D.,** Supt. of Filtration Plant, Univ. of North Carolina, Box 1126, Chapel Hill, N.C. (July '44) *P*

**Saunders, William K.,** W. K. Saunders Co., 12770 Lyndon Ave., Detroit 27, Mich. (May '30)

**Saville, Caleb Mills,** Mgr. & Chief Engr., Water Works, 53 N. Beacon St., Hartford 3, Conn. (Mar. '16)

**Saville, Thorndike,** Prof. of Hydr. & San. Eng., New York Univ., Box 65, University Heights, New York 53, N.Y. (Aug. '20)

**Sawyer, Clair N.,** 2010 University Ave., Madison 5, Wis. (Jan. '41) *P*

**Sawyer, Robert W.,** Asst. Engr. with Malcolm Pirnie, 25 W. 43rd St., New York 18, N.Y. (Oct. '32) *P*

**Sax, Arthur C.,** Field Engr., The Permutit Co., 3546—74th St., Jackson Heights, N.Y. (Apr. '44) *MP*

**Sayre, A. Nelson,** Sr. Geologist, U.S. Geological Survey, Washington, D.C. (Apr. '43)

**Sayre Water Co.,** George M. West, Sayre, Pa. (Corp. M. Jan. '42)

**Scarborough Public Utilities Com.,** Ronald Harrison, Mgr. & Secy.-Treas., 1666 Kingston Rd., Toronto 13, Ont., Can. (Corp. M. Jan. '35)

**Scarritt, Elwood W.,** Chem. Director, Elgin Softener Corp., 120–170 N. Grove Ave., Elgin, Ill. (Dec. '28) *P*

**Schaefer, F. A.,** Gas & Water Supt., 1247 Beechwood Ave., New Albany, Ind. (July '35)

**Schaefer, Walter A.,** San. Engr., 38 Prince St., Elizabeth 3, N.J. (Jan. '37) ★

**Schaeffer, Joseph G.,** San. Engr., Dept. of Public Health, Parliament Bldgs., Regina, Sask., Can. (Jan. '37) *P*

**Schaeffer, W. L.,** *see* National Tube Co.

**Schamberger, Karl H.,** Asst. Civ. Engr., Bureau of Water Supply, 1314 Lakeside Ave., Baltimore, Md. (Jan. '42)

**Scharff, Maurice R.,** Cons. Engr., 285 Madison Ave., New York 17, N.Y. (Jan. '26) ★

**Schaut, George G.,** Sr. Bacteriologist, Bureau of Water, Belmont Ave. & Ford Rd., Philadelphia 31, Pa. (Oct. '22) *P*

**Scheak, Harrison M.,** Chemist, Victoria Park Filtration Plant, Queen St., E., Toronto, Ont., Can. (Jan. '43) *P*

**Scheffer, Louis K.,** Dist. San. Engr., State Dept. of Health, 1013 Green St., Harrisburg, Pa. (July '42) *P*

**Scheinert, Albert G.,** Sales Mgr., Pittsburgh Branch, Rensselaer Valve Co., 2203 Oliver Bldg., Pittsburgh 22, Pa. (Oct. '39)

**Schenectady, City of,** John H. Burwell, Engr., Dept. of Water, 102 City Hall, Schenectady, N.Y. (Corp. M. July '37)

**Scheuner, Herbert A.,** Secy., Mountain Water Co., Box 931, La Crescenta, Calif. (Jan. '43) *AM*

**Schimberg, E. A.,** Jr. Engr., Johns-Manville Sales Corp., 116 New Montgomery St., San Francisco, Calif. (Oct. '42)

**Schiverea, W. J.,** Borough Engr., Municipal Bldg., Freehold, N.J. (Oct. '35) *M*

**Schlicht, John C.,** Gen. Supt. of Constr. & Services, Hackensack Water Co., 4100 Park Ave., Weehawken, N.J. (June '26) *M*

**Schlie, Everett H.,** Asst. Chemist, Chesapeake & Ohio Ry. Co., 578½ W. Main St., Peru, Ind. (Apr. '42) *P*

**Schlott, Ralph,** Supervisor of Distr., Canton Water Works, 126 Park Ave., S.W., Canton 6, Ohio (July '39)

**Schmid, Theophilus, Jr.,** Chief San. Engr., Water Purif. Div., 10404 Sangamon St., Chicago 43, Ill. (Apr. '26) *P*

**Schmidt, Howard D.,** 2620 W. Ashwood Ave., Nashville 5, Tenn. (Apr. '36) *Fuller Award '40. Director '41–'42.*

**Schmit, Jos. M.,** City Engr. & Water Works Supt., Box 931, Lewistown, Mont. (Apr. '26) *Director '36–'39.*

**Schmitt, Edwin A.,** Head Engr., Water Supply, Washington Aqueduct, U.S. Engr. Office, 1st & Douglas Sts., N.W., Washington 25, D.C. (Jan. '39) *M*

**Schmitt, Herbert C.,** Water Dept., 3255 N. 49th St., Milwaukee, Wis. (July '38)

**Schmitt, Mike, Jr.,** Supt., Pumping Station, Box 238, Evansville, Ind. (Jan. '43) *M*

**Schmoeller, C. C.,** *see* Mississippi Lime Co.

**Schmuck, Leo M.,** Jr. Treatment Plant Operator, Water Dept., 1203 S.W. 2nd St., Fort Lauderdale, Fla. (July '43)

**Schnabel, William R.,** Supt. & Engr., Bureau of Water, City Hall, Allentown, Pa. (Apr. '24) *M*

**Schneider, H. J.,** Supt. of Filtration, 1746 Doty St., Oshkosh, Wis. (June '31) *P*

**Schneider, William H.,** Chemist-in-Charge, Filtration Plant, Fremont, Ohio (Oct. '30) *MP*

**Schneider, William J.,** Operating Engr., Illinois Munic. Water Co., 802 W. Walnut St., Robinson, Ill. (Oct. '41) *MP*

**Schoenewey, G. W.,** Supt., Speedway Water Works, 4947 W. 16th St., Speedway 8, Ind. (Apr. '44) *M*

**Schoepfle, O. F.,** Chemist, Filtration Plant, 908 Vine St., Sandusky, Ohio (May '30)

**Scholl, Charles E.,** Supt., Water & Light Dept., 408 W. 16th St., New Castle, Ind. (Apr. '29) *M*

**Scholz, Henry R.,** Water Registrar, Water Dept., 255 Main St., White Plains, N.Y. (Affil. Jan. '41) *A*

**Schoolcraft, Dan,** Water Works Engr., Muscatatuck Colony, Butlerville, Ind. (Affil. Apr. '38)

**Schoonmaker, George N.,** City Mgr. & Chief Water Works Engr., Toledo 2, Ohio (Aug. '21)

**Schouten, Ernest W.,** Dist. Mgr., Wallace & Tiernan Co., Inc., 828 Braniff Bldg., Oklahoma City 2, Okla. (Jan. '39) *P*

**Schrader, Elmer C.,** Supt., City Water Dept., Denton, Mont. (Apr. '41)

**Schramm, R. H.,** Dist. Sales Repr., James B. Clow & Sons, 1903 N.B.C. Bldg., 815 E. Superior Ave., Cleveland 14, Ohio (July '40)

**Schroeder, G. A.,** Supt., Water Dept., 305 W. Nott St., Tomah, Wis. (Oct. '43) *M*

**Schroepfer, George J.,** Chief Engr. & Supt., Minneapolis-St. Paul Sanitary Dist., Box 3598, St. Paul 1, Minn. (July '43) *M*

**Schuber, A. R.,** *see* Mortell, J. W., Co.

**Schuck, H. W.,** Supt. of Water Dept., 804 Bayswater Ave., Burlingame, Calif. (June '27)

**Schuhmacher, G. S.,** Service Engr., Los Angeles Branch, Calgon, Inc., 1807 E. Olympic Blvd., Los Angeles 21, Calif. (Oct. '42) *P*

**Schulze, Else L. (Miss),** Technical Librarian, The Proctor & Gamble Co., Technical Library, M.A. & R. Bldg., Ivorydale 17, Ohio (Jan. '43) *P*

**Schumpert, Homer W.,** Supt., Water, Light & Sewer Depts., Box 333, Newberry, S.C. (Aug. '25)

**Schunke, G. B.,** Asst. Supt., 323 County-City Bldg., Seattle 4, Wash. (Jan. '29) *Director '44. A*

**Schwab, J. W.,** *see* Texas Gulf Sulphur Co., Inc.

**Schwabe, Walter P.,** Mgr., Northern Div., Connecticut Light & Power Co., Thompsonville, Conn. (Nov. '14) *M*

**Schwada, J. P.,** City Engr., Milwaukee 2, Wis. (May '24) *Fuller Award '44. MP*

**Schwartz, Jacob,** Attorney at Law, 5 Pomona Ave., Newark 8, N.J. (Jan. '36)

**Schwartz, M. C.,** Asst. Director, Engineering Expt. Station, Chem. Eng. Bldg., Louisiana State Univ., Baton Rouge 3, La. (Apr. '38) *P*

**Schwartz, M. H.,** Supt. & Gen. Mgr., Vincennes Water Dept., Box 28, Vincennes, Ind. (June '29) *Director '43–'46. MP*

**Schwarz, Eugene,** Supt., City Water Dept., Rochester, Minn. (June '27) *M*

**Schwarzler, C.,** *see* Foxboro Co.

**Schweitzer, R. R.,** *see* Layne-Atlantic Co.

**Schwier, Elmer C.,** Controller, Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Dec. '24) *A*

**Schwier, Harry,** Mgr., Batesville Water Works, Batesville, Ind. (July '35) *P*

**Schwob, Carl E.,** Regional San. Engr., U.S. Public Health Service, 519 Monte Vista, Dallas, Tex. (July '43)

**Schworm, William B.,** Sr. Chem. Engr., Supply & Purif. Sec., St. Louis Water Div., Chesterfield, Mo. (Apr. '42) *MP*

**Scott, Guy R.,** Sr. San. Engr., Tennessee Valley Authority, Wilson Dam, Ala. (Oct. '37) *P*

**Scott, Joseph E.,** Supt., Water Dept., Village Hall, South Orange, N.J. (Jan. '37)

**Scott, L. H.,** 684 E. Paces Ferry Rd., N.E., Atlanta, Ga. (Jan. '36) *Fuller Award '40. P* ★

**Scott, Luther,** Supt. of Water, City Hall, Ellensburg, Wash. (Apr. '44)

**Scott, Oswald H.,** *see* Belleville Public Utilities Com.

**Scott, P. E.,** Water Supt., Enumclaw, Wash. (Jan. '43) *M*

**Scott, R. D.,** Acting Chief, Lab. Div. State Dept. of Health, 1650 Essex Rd., Columbus 8, Ohio (Oct. '38) *P*

**Scott, Rossiter S.,** Dist. Mgr., Dresser Mfg. Co., 17 E. 42nd St., New York 17, N.Y. (Mar. '22) *M*

**Scott, Walter M.,** San. Engr., 145 S. 3rd Ave., Mount Vernon, N.Y. (Apr. '38)

**Scott, Walter Moffat,** Chairman of Comrs., Greater Winnipeg Water Dist., 185 King St., Winnipeg, Man., Can. (Mar. '14) *Fuller Award '41.*

**Scott, Warren J.,** 34 Garfield Rd., West Hartford 7, Conn. (Oct. '22) *Director '41–'44. P*

**Scott-Smith, Herbert,** Supt. of Public Works, 114 Benedict St., Waterbury 65, Conn. (July '42)

**Scoular, Spencer Gray,** City Engr., Dunedin City Corp. of New Zealand, Town Hall, Dunedin, C.I., New Zealand (Jan. '39)

**Scoville, C. M.,** Secy., Corona City Water Co., 707 Main St., Corona, Calif. (Jan. '35) *M*

**Scranton-Spring Brook Water Service Co.,** 135 Jefferson Ave., Scranton 3, Pa. (Corp. M. June '12)

**Seabury, George T.,** Secy., American Soc. of Civ. Engrs., 33 W. 39th St., New York 18, N.Y. (June '30)

**Seaman, Henry,** Supt., Water Dept., The Champion Paper & Fibre Co., Canton, N.C. (July '35) *M*

**Seaman, Roy E.,** *see* Greeley, City of

**Sears, Dow I.,** *see* Fergus Falls Water & Light Dept.

**Seattle Water Dept.,** W. C. Morse, Supt., 323 County-City Bldg., Seattle 4, Wash. (Corp. M. July '28) *Director '44–'47.*

**Seay, J. I.,** Pres., Layne-Central Co., Memphis 8, Tenn. (July '38) *M*

**Secker, William M., Jr.,** Asst. Engr., Passaic Valley Water Com., 137 Ellison St., Paterson, N.J. (Apr. '43) *M*

**Seeholzer, Bert, Jr.,** 75 Bergen St., Westwood, N.J. (July '35)

**Seelye, Theodore E.,** *see* Day & Zimmermann, Inc.

**Seemann, Carl W.,** Gen. Foreman, Water Service Dept., 311 Newton Ave., N., Minneapolis 11, Minn. (Jan. '39)

**Seery, Francis J.,** Prof. of Hydr. Eng., Cornell Univ., 504 University Ave., Ithaca 21, N.Y. (Nov. '19)

**Segerstrom, Eric J.,** Riverbank Water Co., Sonora, Calif. (July '37)

**Seibert, U. J.,** Chemist, Filter Plant, 218—22nd Ave., N., St. Cloud, Minn. (Oct. '31) *MP*

**Seidensticker, F. W.,** Sr. Filtration Designer, Div. of Water Purif., 1006 City Hall, Chicago 2, Ill. (Jan. '42) *P*

**Seifert, William P.,** Cons. Engr., Buck, Seifert & Jost, 112 E. 19th St., New York 3, N.Y. (Jan. '36) *AP*

**Self, Joseph B., Sr.,** Chief Engr., Muncie Water Works, 1800 Burlington Drive, Muncie, Ind. (Jan. '38) *P*

**Sellers, J. Ben,** Supt. of Water & Sewer Dept., Rule, Tex. (Oct. '42) *M*

**Semmes, Oliver J., Jr.,** 701 W. Moreno St., Pensacola, Fla. (Apr. '37) ★

**Seneca Falls Water Dept.,** S. W. Pratt, Supt., 136 Fall St., Seneca Falls, N.Y. (Corp. M. Apr. '37)

**Senevey, J. D.,** Comr., Accounts & Collections, Water Dept., 3524 Locust St., Kansas City, Mo. (Jan. '44)

**Senges, Donald C.,** Engr., The Permutit Co., 5706 Roeland Parkway, Mission, Kan. (Jan. '39) ★

**Senior, Samuel Palmer,** Pres. & Engr., Bridgeport Hydraulic Co., Bridgeport, Conn. (July '06)

**Sensabaugh, Reeve Lee,** Supt. of Water Supply, Muskegon 12, Mich. (Jan. '39) *P*

**Sepede, Frank,** Engr., Sepede & Sepede, 119 Main St., Lodi, N.J. (Oct. '43)

**Sette, Francis J.,** 4701 Connecticut Ave., N.W., Washington 8, D.C. (July '34) *MP*

**Setzer, H. K.,** Supt. of Public Works, Hickory, N.C. (Oct. '42)

**Setzler, G. V.,** Supt. of Water & Sewers, Box 213, Saluda, S.C. (Affil. Jan. '38)

**Seufer, Paul E.,** 6511—48th St., N.E., Seattle 5, Wash. (Apr. '37) ★

**Sewickley Comrs. of Water Works,** J. S. Besterman, Supt., Municipal Bldg., Sewickley, Pa. (Corp. M. July '35)

**Sexton, Oren D.,** Supt., La Cumbre Mutual Water Co., Hope Ranch, Santa Barbara, Calif. (Apr. '44) *M*

**Seymour, Edward W.,** *see* Non-Corrosive Products Co.

**Shafer, Leslie H.,** Chief Operator, Water Dept., Cobleskill, N.Y. (Jan. '44)

**Shaffer, Phil. A.,** *see* Berlin Water Co.

**Shaler, Richard G.,** 295 Summit Ave., Mill Valley, Calif. (July '42)

**Shanahan, A. Martin,** Mgr., Shanahans, Ltd., Box 280, Vancouver, B.C., Can. (Affil. Jan. '43) *P*

**Shaneman, Fred C.,** Vice-Pres., Pennsylvania Salt Mfg. Co., 2901 Taylor Way, Tacoma 1, Wash. (Jan. '28)

**Shank, John J.,** Chemist & Bacteriologist, Wayne Labs., 17 E. Main St., Waynesboro, Pa. (May '30) *P*

**Shank, Robert D.,** Supervising Clerk, Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (Oct. '43)

**Shannon, Albert M.,** Sr. San. Chemist, Detroit Dept. of Water Supply, 8300 W. Warren Ave., Dearborn, Mich. (Apr. '41) *P*

**Shapiro, Maurice A.,** Asst. Sanitarian (R), U.S. Public Health Service, State Board of Health, Box 1228, Panama City, Fla. (Oct. '43)

**Sharp, Clifford,** P.A. San. Engr. (R), U.S. Public Health Service, 852 U.S. Custom House, Chicago 7, Ill. (Jan. '44) *P*

**Sharp, Edwin T.,** Asst. Supt. of Stores, Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (Oct. '43)

**Sharp, Fred,** Supt., Water Works, 317 Poplar St., Tipton, Ind. (Apr. '44)

**Sharp, J. M.,** *see* Oil City Bureau of Water

**Sharpe, Leslie P.,** Mgr., Ohio Water Service Co., 235 State St., Struthers, Ohio (Apr. '43) *M*

**Shaw, Arthur L.,** Cons. Engr., Metcalf & Eddy, 1300 Statler Bldg., Boston 16, Mass. (May '31)

**Shaw, Frank R.,** Sr. San. Engr., U.S. Public Health Service, 3270 Worthington St., N.W., Washington 15, D.C. (June '28) *P*

**Shaw, Harry B.,** Deputy Chief Engr., Washington Suburban Sanitary Dist., Hyattsville, Md. (Apr. '23) *MP*

**Shaw, Leland,** Supt., City Water Works, City Hall, Baraboo, Wis. (Jan. '43) *M*

**Shaw, Percy A.,** Engr. & Supt. of Water Works, Old Courthouse, Manchester, N.H. (June '34) *AMP*

**Shaw, Ralph D.,** Supt., Water Dept., Albany, Ind. (Apr. '44)

**Shaw, Robert S.,** San. Engr., State Dept. of Health, State House, Trenton, N.J. (Jan. '43) *P*

**Shaw, W. E.,** Regional Water Works Advisor, Bureau of San. Eng., State Dept. of Public Health, 6510 Pineneedle Drive, Oakland 11, Calif. (Oct. '42)

**Shaw, Walter A.,** Cons. Engr., 30 N. La Salle St., Chicago 2, Ill. (July '06) *M*

**Shawver, G. B.,** Gen. Mgr., Consolidated Water Co., Inc., Box 229, Athens, Tenn. (Apr. '30) *M*

**Shea, John J.,** Supt. of Public Works, Frankfort, N.Y. (Apr. '38)

**Shea, Walter J.,** San. Engr., State Dept. of Health, 335 State Office Bldg., Providence, R.I. (July '41) *P*

**Sheboygan Board of Water Comrs.,** J. Allan Hammes, Asst. Secy., Sheboygan, Wis. (Corp. M. June '20)

**Shed, Joseph L.,** 464 Gerard St., East Aurora, N.Y. (Apr. '37) *M*

**Shedden, John S.,** Dist. Mgr., The Permutit Co., 39 Ardsley Road, Montclair, N.J. (Jan. '44) *P*

**Sheehan, Edward D.,** Supt., Water Dept., City Hall, Camden, N.J. (Oct. '42)

**Sheen, Robert T.,** 1300 E. Mermaid Ave., Philadelphia 18, Pa. (Jan. '38) *P*

**Sheldon, Edward E.,** Pres., Utilities Engineering Co., 22 Lodge St., Albany, N.Y. (July '41)

**Sheldon, Horace A.,** Comr., Port Jervis, N.Y. (Apr. '31)

**Shelton, E. P.,** Mgr., Tulsa Office, Chicago Bridge & Iron Co., 1405 Hunt Bldg., Fourth & Main Sts., Tulsa 3, Okla. (Apr. '44)

**Shenango Valley Water Co.,** A. R. Girdwood, Box 542, Sharon, Pa. (Corp. M. Apr. '22)

**Shenker, Samuel,** 155 S. Broadleigh Rd., Columbus 9, Ohio (July '35) *P*

**Shepard, George,** City Engr., St. Paul 2, Minn. (Apr. '33)

**Shephard, Robert O.,** 1202—24th Ave., Meridian, Miss. (Jan. '43) *M*

**Shepherd, Ralph,** Assoc. Civ. Engr., Bureau of Water Supply, 4636 Rokeby Rd., Baltimore 29, Md. (July '42) *M*

**Sherard, Ray L.,** Supt. of Water System, 3010 Cribbon Ave., Cheyenne, Wyo. (Oct. '42) *P*

**Sherbondy, F. G.,** Vice-Pres., The Biggs Boiler Works Co., 1007 Bank St., Akron 5, Ohio (Jan. '39)

**Sheridan, Mark I.,** Gen. Meter Foreman, Water Meter Div., 3148 S. Sacramento Ave., Chicago 23, Ill. (Apr. '44) *M*

**Sheridan, T. F.,** *see* Dixie Lime Products Co.

**Sherman, Arthur L.,** Westchester Apts., Washington, D.C. (Feb. '24)

**Sherman, E. W.,** *see* Sherman Machine & Iron Works

**Sherman Machine & Iron Works,** E. W. Sherman, Vice-Pres., 2-26 E. Main St., Oklahoma City 2, Okla. (Assoc. M. Jan. '40)

**Sherrill-Kenwood Water Com.,** J. Wayland Smith, Chairman, Kenwood, Oneida, N.Y. (Corp. M. Apr. '21)

**Sherwood, C. A.,** *see* Nutley Water Dept.

**Sherwood, Herbert P.,** Sales Engr., The Permutit Co., 407 S. Dearborn St., Chicago 5, Ill. (Apr. '38) *P*

**Sherwood, Patricia, (Miss),** Lab. Technician, Dept. of Plants, Cypress Landing, Fort Lauderdale, Fla. (July '44)

**Shewbridge, W. H.,** Asst. Engr., State Health Dept., 1506 Greycourt Ave., Richmond 22, Va. (Jan. '43) *P*

**Shiddell, Edward B.,** Dist. Mgr., Electro Rust-Proofing Corp., Lawrence Road, Newtown Square, Pa. (Jan. '44) *M*

**Shildmyer, Frank W.,** Chief Clerk, Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Jan. '41)

**Shimpach, John,** *see* Owatonna Munic. Public Utilities

**Shinn, Alonza,** Supt., Water Dept., Burlington, N.J. (Jan. '41) *MP*

**Shipley, Fred G.,** Engr., Public Service Dept., 1401 Valley Heart Drive, Burbank, Calif. (Oct. '43)

**Shnidman, Louis,** Lab. Director, Rochester Gas & Elec. Corp., 89 East Ave., Rochester 4, N.Y. (Mar. '29) *P*

**Shockley, C. A.,** The Shockley Engineering Co., 800 Graphic Arts Bldg., Kansas City 6, Mo. (Apr. '44) *P*

**Shoemaker, J. R.,** *see* San Dimas-Charter Oak Domestic Water Co.

**Shoemaker, Milton J.,** Chem. Engr., Research Products Corp., 1015 E. Washington Ave., Madison 3, Wis. (May '33) *P*

**Shoemaker, William C.,** Mgr., Richmond Water Works Corp., Richmond, Ind. (Apr. '30) *M*

**Shonerd, R. E.,** Chief Mech. Engr., 1006 Hall of Records, Los Angeles, Calif. (June '28)

**Shoppee, John S. C.,** Mgr., Water Div., Fletcher Chemical Co., Pty., Ltd., 43 Rooney St., Burnley, Victoria, Australia (Jan. '43)

**Shore, Jack,** Asst. Supt., Beacon Mfg. Co., Swannanoa, N.C. (Jan. '43)

**Shotts, Rupert E.,** Pres., Associated Public Utilities Corp., 17 N. High St., Columbus, Ohio (Apr. '44)

**Showell, E. B.,** Ind. Eng. Div., E. I. du Pont de Nemours & Co., du Pont Bldg., Wilmington 98, Del. (Nov. '25) *P*

**Shreve, G. F.,** *see* Oshawa Public Utilities Com.

**Shuff, Evans L.,** Engr. & Sales Agent, 412 Title Bldg., Atlanta 3, Ga. (Apr. '38) *P*

**Shuldener, Henry L.,** 423 W. 126th St., New York 27, N.Y. (May '30) *P*

**Shull, Albert B.,** Water Treatment Operator, Dept. of Water & Power, 2488 Coolidge Ave., Los Angeles 34, Calif. (Apr. '33)

**Shull, Kenneth Edgar,** Chemist, Philadelphia Suburban Water Co., 762 Lancaster Ave., Bryn Mawr, Pa. (Jan. '38) *P*

**Shultz, H. M.,** Supt., City Water Works, City Bldg., Huntington, Ind. (Jan. '40)

**Shurtleff, A. I.,** Service Engr., Pittsburgh Equitable Meter Co., 216 S. Jamestown Ave., Tulsa 4, Okla. (July '44) *M*

**Sichler, Vance A.,** Asst. Water Engr., Hercules Powder Co., Route 4, Baraboo, Wis. (Apr. '44) *MP*

**Siebert, M. J.,** Sales Repr., Neptune Meter Co., 3319 Suffolk Rd., Richmond 22, Va. (July '41)

**Siebold, Arthur H.,** Collector of Accts., Cleveland Heights Water Dept., 2953 Mayfield Rd., Cleveland Heights 18, Ohio (July '43)

**Siegel, Joseph,** Civ. Eng. Assoc., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '43)

**Siegmund, Rudolph A.,** 558 Adam St., Tonawanda, N.Y. (Apr. '39) ★

**Sieker, F. W.,** Supt., Water Dept., 112 E. Rutledge St., Yates Center, Kan. (Oct. '39) *P*

**Sierra Pacific Power Co.,** W. A. Totman, Water Dept. Supt., Reno, Nev. (Corp. M. Feb. '13)

**Sieveka, Ernest H.,** Chem. Lab., Iowa Ordnance Plant, Center Junction, Iowa (Apr. '42)

**Signor, C. V.,** Water Supt., Grants Pass, Ore. (Apr. '36)

**Sigworth, E. A.,** Chemist & Technician, Industrial Chemical Sales Div., 230 Park Ave., New York 17, N.Y. (Jan. '37) *P*

**Silberbauer, Walter R.,** Engr., Campbell Water Co., 14 Rincon Ave., Campbell, Calif. (Oct. '43) *M*

**Silcox, H. E.,** Asst. Engr., Water Supply, Chesapeake & Ohio Ry. Co., 702—1st & Merchants National Bank Bldg., Richmond 10, Va. (Jan. '42) *MP*

**Siler City, Town of,** W. O. Mann, Supt. of Water Dept., Siler City, N.C. (Corp. M. Oct. '42)

**Silitch, Eugene W.,** *see* Ranney Water Collector Corp. of New York

**Sill, George H.,** *see* Bird-Archer Co.

**Sills, T. O.,** *see* Concord Board of Light & Water Comrs.

**Silver City Water Dept.,** C. E. Ward, Supt., Silver City, N.M. (Corp. M. Oct. '41)

**Silver Creek Water Works,** J. K. Brotz, Supt., Silver Creek, N.Y. (Corp. M. Apr. '37)

**Silver, Ralph R.,** Business Mgr. of Journal, Southeastern Sec. A.W.W.A., 310 Protective Life Bldg., Birmingham 3, Ala. (July '35)

**Simantel, Alvin,** 4374 Woodland Ave., Western Springs, Ill. (July '35)

**Simard, Joseph W.,** Cons. Engr., International Water Supply, Ltd., Mount Royal Hotel, Montreal, Que., Can. (Jan. '41)

**Simcoe, N. W.,** Repr., Pittsburgh Equitable Meter Co., 416 Luverne Ave., Minneapolis 9, Minn. (Jan. '41) *M*

**Simcoe Public Utilities Com.,** G. E. Maxwell, Supt., Water Works Dept., Simcoe, Ont., Can. (Corp. M. Apr. '29)

**Simmermacher, S. C.,** Chief of Power Plants, Div. of Water & Heat, 611 Auditorium Bldg., Cleveland 14, Ohio (Jan. '42) *M*

**Simmonds, M. A.,** Resident Analyst, Brisbane City Council, Mt. Corsby, via Ipswich, Queensland, Australia (July '37)

**Simmons, Frank,** Supt., Water Works, Russellville, Ky. (Apr. '38) *MP*

**Simmons, Paul D.,** Chemist, Weirton Improvement Co., Weirton, W.Va. (Oct. '38) *MP*

**Simms, R. B.,** Supt., Water Works, Spartanburg, S.C. (May '22)

**Simons, Thomas,** *see* U.S. Pipe & Foundry Co.

**Simonton, L. R.,** Supt. of Filtration, Light, Water & Sewerage Dept., Griffin, Ga. (Apr. '34) *P*

**Simplex Valve & Meter Co.,** Everett M. Jones, Sales Mgr., 6759 Upland St., Philadelphia 42, Pa. (Assoc. M. May '14)

**Sinclair, Harold,** Vice-Pres., Turbine Equipment Co., 75 West St., New York 6, N.Y. (Apr. '30)

**Singer, Oscar C.,** Dist. Engr., State Dept. of Health, Lucas County Board of Health, 902 Adams St., Toledo 2, Ohio (July '44) *P*

**Singer, Robert,** Supt., Water Dept., 2112 S. 77th St., West Allis 14, Wis. (Oct. '43)

**Sioux Falls Water Works,** Jos. S. Nelson, Comr., Sioux Falls, S.D. (Corp. M. May '27)

**Sisler, Harry H.,** Cons. Engr., 2821—29th Ave., W., Seattle 99, Wash. (Apr. '43)

**Skagit Co. Public Utility Dist. No. 1,** Lawrence B. Judy, Mgr., 313 Kincaid St., Mount Vernon, Wash. (Corp. M. Apr. '44)

**Skiles, A. W.,** Plant Operator, Water Dept., 345 S. Palm, Beverly Hills, Calif. (Oct. '43)

**Skinker, Thomas J.,** Director of Public Utilities, 312 City Hall, St. Louis 3, Mo. (July '24) *Director '31–'32. AM*

**Skinner, Hervey J.,** Pres., Skinner & Sherman, Inc., 246 Stuart St., Boston 16, Mass. (Apr. '26) *P*

**Skinner, John F.,** 1610 Idlewood Rd., Glendale 2, Calif. (May '27) *P*

**Skinner, M. B., Co.,** F. R. McMurray, Vice-Pres.—Sales, South Bend, Ind. (Assoc. M. Jan. '41)

**Skinner, Robert A.,** Office Engr., Metropolitan Water Dist. of Southern California, 306 W. 3rd St., Los Angeles 13, Calif. (Apr. '43) *M*

**Slater, E. O.,** Pres., Smith-Emery Co., 920 Santee St., Los Angeles 15, Calif. (Apr. '22) *P*

**Slater, L. N.,** Pres., Western Pipe & Steel Co., 5717 Santa Fe Ave., Los Angeles 54, Calif. (Sept. '31)

**Slazas, Tony,** Supt., Westville Water System, 318 W. Main St., Westville, Ill. (July '42)

**Slee, R. W.,** Gen. Mgr., Wiley-Slee Assoc., 228 N. La Salle St., Chicago 1, Ill. (Jan. '38) *M*

**Sleeper, Benjamin A.,** Civ. Engr. & Surveyor, 501 Cooper St., Camden, N.J. (Dec. '30)

**Sleeper, William H.,** 126–25—144th St., South Ozone Park, N.Y. (May '23)

**Sleight, Fred S.,** Supt., Light & Water Dept., New England, N.D. (Jan. '44)

**Sloan, Garrett,** Regional San. Engr., State Dept. of Health, New Courthouse, Alexandria, La. (Apr. '42) ★

**Sloan, H. F.,** Asst. Sales Mgr., Cliffs Dow Chemical Co., Marquette, Mich. (Jan. '43)

**Sloat, Harry M.,** Eng. Aide, Dept. of Water & Power, 746 S. Coronado St., Los Angeles 5, Calif. (Oct. '43) *P*

**Small, Leon,** Water Engr., Bureau of Water Supply, 500 Municipal Bldg., Baltimore 2, Md. (Jan. '36) *M*

**Small, Sidney S.,** Western Dist. Mgr., Worthington-Gamon Meter Co., 5075 Santa Fe Ave., Los Angeles 11, Calif. (July '35)

**Smalley, Russell C.,** Supt., Highland Park Water Dept., 411 Raritan Ave., Highland Park, N.J. (Jan. '39) *M*

**Smedberg, C. W.,** Box 1382, Atlanta 1, Ga. (Dec. '22) *Director '31–'34. AMP*

**Smith, A. C.,** Supt. & Operator, Matewan Water Works, Box 26, Matewan, W.Va. (Affil. Jan. '39) *A*

**Smith, A. P., Mfg. Co.,** Hubert F. O'Brien, East Orange, N.J. (Assoc. M. June '97)

**Smith, Benjamin L.,** 11 N. Pearl St., Albany, N.Y. (June '30)

**Smith, Bijah G.,** City Engr. & Water Supt., Camas, Wash. (Apr. '36)

**Smith, Chester A.,** Cons. Engr., Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City 2, Mo. (Sept. '24) *P*

**Smith, Delbert D.,** Gen. Mgr., Montecito County Water Dist., 583 San Ysidro Rd., Santa Barbara, Calif. (Apr. '30)

**Smith, E. Vernon,** Supt. of Public Works, Park Ridge, N.J. (Dec. '30) *M*

**Smith, Edward E.,** 124 N. Nixon Ave., Lima, Ohio (July '35) ★

**Smith, Edwin F.,** City Engr., 712 Normal Ave., Normal, Ill. (Apr. '41) ★

**Smith, Egmont S.,** Neptune Meter Co., 2014 Commerce St., Dallas 1, Tex. (Oct. '34) *Director '35–'36. Fuller Award '43. AM*

**Smith, Elmer,** Supt. of Water Works, Munic. Water & Light Dept., Owensboro, Ky. (Apr. '39) *M*

**Smith, Emmett A.,** Pres., Southern Heater Co., Inc., 844 Baronne St., New Orleans 13, La. (Apr. '43)

**Smith, F. Burton,** Florida Utilities Corp., Winter Park, Fla. (July '43)

**Smith, F. G.,** *see* American Brass Co.

**Smith, George F.,** *see* Barrie Public Utilities Com.

**Smith, Gilbert M.,** San. Engr., c/o Post Engr., Camp Breckinridge, Ky. (Oct. '41)

**Smith, Gordon B.,** *see* Well Machinery & Supply Co.

**Smith, Grace Ritter (Miss),** San. Engr., Rohr Aircraft, 3715 Vermont St., San Diego 3, Calif. (Oct. '43)

**Smith, Guilford V.,** Sr. Engr., Johns Hopkins Univ. Applied Physics Lab., 8621 Georgia Ave., Silver Spring, Md. (Jan. '43)

**Smith, Hal F.,** Sr. Admin. Asst., Dept. of Water Supply, 506 Water Board Bldg., Detroit 26, Mich. (June '29) *Diven Medal '39. Fuller Award '39. AM*

**Smith, Harold T.,** Pres., International Water Co., Apdo. 467, Caracas, Venezuela, S.A. (July '38)

**Smith, Herman H.,** Supt., Dept. of Water Works, Lagrange, Ind. (Jan. '38)

**Smith, J. F.,** Sales Mgr., Great Western Div., 310 Sansome St., San Francisco 4, Calif. (Dec. '31) *P*

**Smith, J. Joseph,** Comr. of Water, City Hall, Youngstown 3, Ohio (Jan. '44) *M*

**Smith, J. Wayland,** *see* Sherrill-Kenwood Water Com.

**Smith, L. A.,** Asst. Branch Mgr., American Cast Iron Pipe Co., 2701 Fidelity Bldg., Kansas City 6, Mo. (July '44)

**Smith, Leon A.,** Supt. of Water Works, City Hall, Madison 5, Wis. (May '16) *Director '30–'32, '34–'37. Fuller Award '39. AM*

**Smith, Lewis B.,** Supt. of Water Div., 10 Felix St., Rochester 6, N.Y. (Apr. '41) *M*

**Smith, Louie D.,** Official, Village of Brockport, 37 Market St., Brockport, N.Y. (Apr. '44)

**Smith, Louis P.,** Pres. & Gen. Mgr., The Farnan Brass Works Co., Box 6147, Cleveland 1, Ohio (July '38)

**Smith, M. C.,** Chief Engr., Dept. of Public Utilities, 317 City Hall, Richmond 19, Va. (May '25) *Director '37–'40. Fuller Award '40. MP*

**Smith, Meloy,** Cons. Engr., 16 State St., Rochester 4, N.Y. (Mar. '34)

**Smith, Neal D.,** City Mgr., City Hall, Ontario, Calif. (July '40) *M*

**Smith, Norman F.,** Vice-Pres., International Water Co., Apdo. 630, Quito, Ecuador, S.A. (July '38)

**Smith, O. M.,** Chemistry Dept., Oklahoma A. & M. College, Stillwater, Okla. (Feb. '28) *P*

**Smith, Orville J.,** *see* Quincy Water Works Com.

**Smith, Philip W.,** Field Supt., Dept. of Water & Power, 14601 Aetna St., Van Nuys, Calif. (Oct. '43) *M*

**Smith, R. Beverstock (Mrs.),** Vice-Pres. & Treas., The Farnan Brass Works Co., Box 6147, Cleveland 1, Ohio (July '38)

**Smith, R. J.,** Mgr. & Secy.-Treas., Perth Public Utilities Com., Perth, Ont., Can. (June '11) *MP*

**Smith, Robert Trumbull,** 9818 N.E. Mason St., Portland 13, Ore. (July '30) *P*

**Smith, S.,** City Mgr., 1752—10th St., Reedley, Calif. (May '43) *M*

**Smith, S. Morgan, Co.,** Earl E. Hilker, York, Pa. (Assoc. M. Mar. '34)

**Smith, Spencer B.,** Field Engr., Water Div., 402 City Hall, Tacoma, Wash. (Apr. '41)

**Smith, Sydney H.,** Supt., Board of Public Works, 89 Clinton St., South Haven, Mich. (July '41) *M*

**Smith, T. E.,** 140 Edgewood Ave., Atlanta 3, Ga. (July '35)

**Smith, Telford L.,** *see* Smith-Blair, Inc.

**Smith, Thomas H.,** Water Plant Operator, City Water Plant, Rocky Mount, N.C. (Jan. '43)

**Smith, Vernon, Mng.** Director, John Thompson-Australia-Pty., Ltd., 312 Flinders St., Melbourne, Australia (Jan. '35)

**Smith, Virgil D.,** Supt., City Water Dept., Azusa, Calif. (Oct. '42)

**Smith, W. Austin,** Cons. Engr., Box 1048, Jacksonville, Fla. (Dec. '26) *P*

**Smith, W. D.,** Sales Engr., Eshelman & Potter, 8 Augusta Drive, Greenville, S.C. (Apr. '41) *P* ★

**Smith, W. E.,** Dist. Mgr., Wallace & Tiernan Co., Inc., 415 Brainard St., Detroit 1, Mich. (Jan. '38) *P*

**Smith, W. P.,** *see* Baker Dept. of Water, Fire & Sanitation

**Smith, Waymon,** Water Works Supt., Marshall Field Co., Leaksville, N.C. (Jan. '39)

**Smith-Blair, Inc.,** Telford L. Smith, Pres., 205 Cypress Ave., South San Francisco, Calif. (Assoc. M. July '41)

**Smithrim, E. R.,** *see* Trenton, Ont., Public Utilities Com. of

**Smithson, Thomas,** 5301 N. Kerby Ave., Portland 11, Ore. (Apr. '40) *P* ★

**Smolenski, Alexander,** *see* Hamtramck Water Dept.

**Smouse, John P., Jr.,** 1801 Dewey Ave., St. Joseph 33, Mo. (June '31) *P* ★

**Smyre, R. E.,** *see* Hickory, City of

**Snead, W. Ben,** Asst. Sales Mgr., Lynchburg Foundry Co., Lynchburg, Va. (Jan. '39)

**Snedeker, L. LeVern,** City Chemist, 150 S. McKenzie St., Adrian, Mich. (May '30) *P*

**Snelsire, William P.,** Dist. Sales Mgr., Pennsylvania Salt Mfg. Co., 541 Union Trust Bldg., Pittsburgh 19, Pa. (July '43)

**Snidow, Herman W.,** Sr. Asst. Engr., State Board of Health, Richmond, Va. (June '26)

**Snodgrass, H. H.,** Supt., Water Dept., 125 E. College St., Covina, Calif. (Oct. '43)

**Snook, James A., Jr.,** California Sales Mgr., Rusta Restor Corp., 8109 El Rita Drive, Los Angeles 46, Calif. (Oct. '41) *M*

**Snow, Barton S.,** Pres. & Hydr. Engr., T. W. Snow Construction Co., 9 S. Clinton St., Chicago, Ill. (June '30)

**Snow, Bayard F.,** Water Div., Office of War Utilities, War Production Board, 2746 Temporary R Bldg., Washington, D.C. (Apr. '36)

**Snow, J. A.,** Mgr., Water Dept., Ashland Water Utility, Ashland, Wis. (July '35)

**Snow, John L.,** Dist. Engr., Layne-Central Co., 601 First National Bank Bldg., Montgomery 4, Ala. (Apr. '44)

**Snuggs, H. R.,** *see* Nova Scotia Board of Insurance Underwriters

**Snyder, Clifford A.,** Chief Chemist, City Utilities, Barberton, Ohio (July '44)

**Snyder, H. B., Jr.,** Buckingham Apts., 314 N. Piedmont St., Arlington, Va. (Oct. '41)

**Snyder, Leonard L.,** Chief Engr., Service Valves, 1449 S. San Pedro, Los Angeles 15, Calif. (Apr. '44)

**Snyder, M. K.,** Prof. of San. Eng., State College of Washington, Pullman, Wash. (Nov. '28) *P*

**Snyder, R. H.,** Mgr., West Penn Water Co., McDonald, Pa. (July '43) *M*

**Snyder, Robert F.,** Mgr., Water Co., Pine St., Cranmoor Manor, Toms River, N.J. (Jan. '37) *P*

**Socha, Max K.,** Asst. Engr. of Design, Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Feb. '33) *M*

**Soden, E. M.,** Supt., Public Utilities Com., Huntsville, Ont., Can. (Jan. '41)

**Soderstrom, C. W.,** *see* Illinois Inspection Bureau

**Soehren, W. L.,** Mgr., Dallas Water Com., Dallas, Ore. (Dec. '30) *M*

**Soffe, B. F.,** Mgr., Michigan Branch, The Permutit Co., Free Press Bldg., Detroit 26, Mich. (Apr. '44) *P*

**Sohle, F. V.,** Southwest Sales Mgr., R. D. Wood Co., 3425 Lovers Lane, Dallas 5, Tex. (Oct. '42)

**Sohler, Geo. W.,** Supt., Water Works, 140 Franklin St., Box 385, Mountain View, Calif. (Oct. '41) *M*

**Solleder, Albert L.,** 288—15th Ave., Columbus, Ohio (July '41)

**Solomon, Gabriel R.,** c/o Mountain Lake Club, Lake Wales, Fla. (Nov. '25)

**Solvay Sales Corp.,** J. V. Stauf, Director of Sales, 40 Rector St., New York 6, N.Y. (Assoc. M. Jan. '36)

**Somers, Verne A.,** Supt., City Water Dept., Stevens Point, Wis. (May '38)

**Sonderegger, A. L.,** Cons. Engr., 925 Central Bldg., Los Angeles 14, Calif. (Mar. '33) *P*

**Sopp, Claude W.,** Asst. Chief Engr. & Gen. Mgr., Pasadena Water Dept., 319 City Hall, Pasadena 1, Calif. (July '35) *MP*

**Sopp, George C.,** Meter & Service Supt., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Apr. '36) *M*

**Sorenson, Ivan J.,** Chemist & Bacteriologist, Superior Water, Light & Power Co., 1230 Tower Ave., Superior, Wis. (July '44) *P*

**Souder, Byron N.,** 411 E. 8th St., Newton, Kan. (Jan. '43) ★

**Sousa, Philip J.,** Comr. of Public Works, Santa Cruz, Calif. (Oct. '43)

**South Jersey Assn. of Water Supts.,** Walter Spencer, Secy., 2707 Bethel Ave., Merchantville, N.J. (Corp. M. Apr. '31)

**South Pasadena, City of,** Frank Clough, City Mgr., 1420 Mission St., South Pasadena, Calif. (Corp. M. Oct. '43)

**Southard, Alvin C.,** Mgr., Water Dept., Inc. Village of Freeport, 46 N. Ocean Ave., Freeport, N.Y. (July '40) *M*

**Southern Alkali Corp.,** 414 Tower Petroleum Bldg., Dallas, Tex. (Assoc. M. July '38)

**Southern California Water Co.,** C. P. Harnish, Exec. Vice-Pres., 1206 S. Maple Ave., Los Angeles 15, Calif. (Corp. M. June '29)

**Southern Pipe & Casing Co.,** Douglas A. Stromsoe, Vice-Pres., Box C, Azusa, Calif. (Assoc. M. Jan. '42)

**Sowden, Howard J.,** Engr. in Charge of Softening Plant, Federal Cartridge Corp., Bldg. 116, Minneapolis 13, Minn. (Jan. '39) *MP*

**Spafford, H. A.,** Prin. San. Engr., Illinois Dept. of Public Health, Capitol Bldg., Springfield, Ill. (Oct. '38) *P*

**Spalding, Geo. R.,** San. Engr., Hackensack Water Co., New Milford, N.J. (June '26) *Fuller Award '41. MP*

**Sparks, B. N.,** *see* Tupper Lake Munic. Water System

**Sparks, George H.,** City Hall, East Point, Ga. (July '35)

**Sparks, Harry H.,** 5118 Echo St., Los Angeles 42, Calif. (Sept. '31) *MP*

**Sparling, R. W.,** Box Sec. 3277 Terminal Annex, Los Angeles, Calif. (Assoc. M. Nov. '25)

**Sparling, Ray C.,** Pacific Coast Sales Mgr., R. W. Sparling Meter Co., 945 N. Main St., Los Angeles, Calif. (Oct. '39) ★

**Spaulding, A. B.,** *see* Keasbey & Mattison Co.

**Spaulding, Charles H.,** Box 83, Springfield, Ill. (July '24) *Goodell Prize '33. Fuller Award '40.*

**Spaulding, Leon H.,** *see* Federal Pipe & Tank Co.

**Specht, James E.,** Supt., Orrville Munic. Utilities, 1133 Perry St., Orrville, Ohio (Apr. '40) *M*

**Speiden, H. W.,** Dept. of Civ. Eng., West Virginia Univ., Morgantown, W.Va. (July '35) *P*

**Spellman, W. A.,** Staynor, Ont., Can. (Jan. '40)

**Spence, W. O.,** Asst. San. Engr., Fort Bragg Water Plant, Overhills, N.C. (Apr. '30) *P*

**Spencer, C. R.,** *see* Lynchburg Foundry Co.

**Spencer, Harold,** Water Works Foreman, Electric & Water Dept., Marshfield, Wis. (July '44)

**Spencer, W. R.,** Prof. of Civ. Eng., Univ. of Arkansas, Fayetteville, Ark. (Oct. '39)

**Spencer, Walter,** *see* South Jersey Assn. of Water Supts.

**Sperry, S. M.,** Chief Chemist, 1804 Olive St., Reading, Pa. (July '35) *P*

**Sperry, Walter A.,** Chem. Engr., 733 S. Fourth St., Aurora, Ill. (Dec. '14)

**Spies, Kenneth H.,** Acting State San. Engr., State Board of Health, 816 Oregon Bldg., Portland 4, Ore. (Jan. '43) *P*

**Spillyards, J. H.,** Mgr., Newport Water Co., Inc., Newport, Ark. (Jan. '43) *P*

**Spitz, Benjamin J.,** Counsel, Passaic Valley Water Com., 45 Church St., Paterson, N.J. (Oct. '43)

**Spokane, City of,** Elmo James, Supt., Water Div., 303 City Hall, Spokane, Wash. (Corp. M. Apr. '12)

**Spradley, J. W.,** *see* M & H Valve & Fittings Co.

**Sprague, Everett H.,** Asst. Supt., Peapack-Gladstone Water Dept., Main St., Peapack, N.J. (Affil. July '41) *P*

**Spratling, A.,** Pacific Gas & Elec. Co., 245 Market St., San Francisco 6, Calif. (Apr. '43)

**Springfield City Water, Light & Power Dept.,** S. T. Anderson, Admin. Asst., Springfield, Ill. (Corp. M. May '30)

**Spurgeon, Ralph,** Supt., Ligonier Water Works, Ligonier, Ind. (Apr. '42)

**Squire, A. Bradford,** Treas., Wm. S. Lozier Co., 10 Gibbs St., Rochester 4, N.Y. (Jan. '44) *P*

**Stack, John P.,** Gen. Supt., City Light & Water Works, 308 N. 5th St., Goshen 2, Ind. (Apr. '42) *M*

**Staeffler, W. C.,** Gen. Mgr., Public Utilities, 817 Franklin St., Manitowoc, Wis. (Jan. '37)

**Staley, H. H.,** Cons. Engr., 416 Woodlawn Ave., Topeka, Kan. (July '38)

**Staley, H. W.,** *see* Remington Arms Co., Inc.

**Stalker, W. D.,** Mgr., Public Utilities, Simcoe, Ont., Can. (Jan. '41) *AM* ★

**Stanfield, Z. A.,** Dist. Mgr., Pittsburgh Equitable Meter Co., 67 McCall St., Memphis, Tenn. (Oct. '40)

**Stanger, W. H.,** Mgr., Munic. Water Dist., 1510 Cravens Ave., Torrance, Calif. (Oct. '37) *M*

**Stankewich, Michael J.,** 116-12—128th St., South Ozone Park 2, N.Y. (Jan. '43) ★

**Stanley, C. M.,** Cons. Engr., Stanley Engineering Co., Box 731, Muscatine, Iowa (Sept. '32) *P*

**Stanley, I. J., Jr.,** *see* Monsanto Chemical Co.

**Stanley, J. Garland,** Asst. Supt., Water Dept., 1010 N. Walnut Ave., Alliance, Ohio (July '43)

**Stanley, William E.,** Prof. of San. Eng., Massachusetts Institute of Technology, Cambridge 39, Mass. (Nov. '20) *P*

**Stannard Power Equipment Co.,** H. V. Bowlby, 53 W. Jackson Blvd., Chicago 4, Ill. (Assoc. M. Jan. '38)

**Stapleton, John E.,** *see* Auburn Water Dept.

**Stapley, Edward R.,** 27 College Circle, Stillwater, Okla. (July '37) *Fuller Award '42. P*

**Starcke, Max,** *see* Lower Colorado River Authority

**Starkey, Fred,** Chief Engr., Caro State Hospital, R.R. 2, Caro, Mich. (Affil. July '42)

**Starling, Charles H.,** Field Engr., Infilco, Inc., 301 Hillside Ave., Charlotte, N.C. (July '38) ★

**Starnes, Tom M.,** Southern Sales Mgr., American Cast Iron Pipe Co., Box 2603, Birmingham 2, Ala. (July '35) *M*

**Statesville City Water Dept.,** H. S. Douglass, Supt., Statesville, N.C. (Corp. M. Oct. '40)

**Statham, Richard N.,** Industrial Chemical Sales Div., 844 Leader Bldg., Cleveland, Ohio (Jan. '36) ★

**Stathas, P. P.,** Partner-Engr., Duff & Phelps, 208 S. La Salle St., Chicago 4, Ill. (July '41)

**Staub, William S.,** Engr., West Virginia Water Service Co., 814 Peoples Bank Bldg., Charleston, W.Va. (July '34) ★

**Stauf, J. V.,** *see* Solvay Sales Corp.

**Stauff, Paul V.,** City Chemist, Park Hotel, Eveleth, Minn. (Jan. '34) *P*

**Stauffer, Howard L.,** Efficiency Engr., Southern California Water Co., 4102 Beck Ave., Bell, Calif. (Apr. '43) *M*

**Staunton, City of,** W. L. Hall, City Mgr., Staunton, Va. (Corp. M. Oct. '43)

**Stava, William,** Sr. Engr., Hydr. Div., California Railroad Com., 536 State Bldg., San Francisco 2, Calif. (May '27) *M*

**Stearns, George A.,** Chem. Engr., Badger Ordnance Works, Hercules Powder Co., Baraboo, Wis. (Apr. '43) *P*

**Stearns, Harrington P.,** Long Island Water Corp., 337 Merrick Rd., Lynbrook, N.Y. (Jan. '14)

**Stearns, Max A.,** Mgr., Kokomo Water Works Co., 209 W. Walnut St., Kokomo, Ind. (Jan. '41) *M*

**Steel Protection & Chemical Co., Inc.,** L. R. Rogers, Pres., Mooresville, Ind. (Assoc. M. Apr. '39)

**Steele, B. P.,** *see* Pennsylvania Salt Mfg. Co.

**Steelman, Elmer S.,** Mgr., Ocean City Water Service Co., 10th St. & West Ave., Ocean City, N.J. (July '29)

**Steenson, H. D.,** Secy., Water Works, Plano, Tex. (Oct. '39) *A*

**Steenson, Sam M.,** City Engr. & Water Works Operator, Water Dept., Plano, Tex. (Apr. '43)

**Steffani, E. C.,** Office Engr., Gas & Water Dept., Coast Counties Gas & Elec. Co., 22 Pacific Ave., Santa Cruz, Calif. (Jan. '39)

**Steffen, Alfred J.,** 1348 Glenlake Ave., Chicago, Ill. (July '42) ★

**Steib, F. L.,** Gen. Mgr., Water Works & Lighting Com., Wisconsin Rapids, Wis. (Jan. '42) *MP*

**Steindorf, R. T.,** *see* Chain Belt Co.

**Steinford, Christian,** *see* Hammermill Paper Co.

**Steitz, Edward J.,** Supt., Water Dept., 16 James St., Middletown, N.Y. (July '42) *M*

**Stenger, Jno. N.,** Engr., Water Dept., 3208 N. 21st Ave., Tacoma, Wash. (Apr. '40)

**Stephanoff, I.,** 917 Blue Island Ave., Chicago, Ill. (Jan. '43) *P*

**Stephens, Felton,** Mgr., Travis County Water Control & Improvement Dist. No. 2, Route 3, Box 175, Austin, Tex. (Jan. '44) *M*

**Stephens, George William, Jr.,** Jennifer Bldg., Towson 4, Md. (July '42)

**Stephens, Uel,** Water Works Supt., 2714 Greene Ave., Fort Worth 4, Tex. (Jan. '43) *AM*

**Stephenson, C. A.,** Chief Engr., Arkansas Fire Prevention Bureau, Hall Bldg., Little Rock, Ark. (July '44) *M*

**Stephenson, Clyde T.,** Chief Engr., State Hospital, Box 476, Jamestown, N.D. (Oct. '43)

**Stephenson, Frank H.,** 6 Richards St., Worcester 3, Mass. (May '20) *P*

**Stephenson, Marvin L.,** Quarterman, Public Works, U.S. Navy, Box 422, Homestead, Fla. (Apr. '44)

**Stepleton, H. A.,** Cons. Engr., 3515 Maxwell Rd., Toledo 6, Ohio (Apr. '40) *MP*

**Stepp, W. H.,** Supt. & Operator, Kermit, W.Va. (Affil.' Jan. '39)

**Sterling, City of,** H. M. Krull, City Clerk, Box 590, Sterling, Colo. (Corp. M. Jan. '39)

**Sterling Engine Co.,** E. T. Herniman, Sales Engr., 1270 Niagara St., Buffalo 13, N.Y. (Assoc. M. Apr. '37)

**Sterling, Marion T.,** Supt., Filter Plant, City Water Dept., Wenatchee, Wash. (Jan. '44) *P*

**Stern, Sollis E.,** Supt., Frankfort Water Works Co., Frankfort, Ind. (May '33) *M*

**Sterns, Edward A.,** Supt., Water Dept., 24 Union St., Hamburg, N.Y. (Apr. '37) *Fuller Award '38. P*

**Steven, James, Jr.,** Florida Sales Mgr., Rusta Restor Div., Johnston & Jennings Co., Box 5, Coconut Grove Station, Miami, Fla. (Apr. '43)

**Stevens, H. Chester,** Technical Director, Bird-Archer Co., 400 Madison Ave., New York 17, N.Y. (July '43) *P*

**Stevens, James S.,** Supt. of Yards & Shops, East Bay Munic. Utility Dist., 2127 Adeline St., Oakland, Calif. (May '33)

**Stevenson, Albert Henry,** Passed Asst. San. Engr. (R), U.S. Public Health Service, Sub-Treasury Bldg., 15 Pine St., New York 5, N.Y. (Jan. '40) *P*

**Stevenson, R. C.,** *see* Idaho Survey & Rating Bureau

**Stevenson, Ralph A.,** Cons. Chemist, 641 Gibbons St., Los Angeles 31, Calif. (Sept. '27) *P*

**Steward, W. R.,** Supt., White County Water Co., Searcy, Ark. (Jan. '42)

**Stewart, C. E.,** General Delivery, Phoenix, Ariz. (Jan. '25)

**Stewart, C. M.,** Supt., Water Dept., Bradford, Pa. (July '35)

**Stewart, Elon P.,** *see* Syracuse Dept. of Engineering

**Stewart, F. D.,** Major, Chief, San. Branch, Hq. 5th Service Command, Fort Hayes, Columbus 18, Ohio (July '44) ★

**Stewart, H. P.,** *see* Stuttgart Munic. Water Works

**Stewart, M. T.,** Mgr., Rockwood Water Co., 768 Grandview Ave., Rockwood, Pa. (Jan. '39) *M*

**Stewart, Marion G.,** Supt., Natchez Water Works, Natchez, Miss. (Feb. '32) ★

**Stewart, Melbourne G.,** Sr. Asst. Civ. Engr., Dept. of Water Supply, 709 Water Board Bldg., Detroit, Mich. (July '40)

**Stewart, Morgan E.,** 1st Lt., Sn.C., APO, 640 c/o Postmaster, New York, N.Y. (Jan. '44) ★

**Stewart, Neil G.,** Asst. Engr., Dept. of Works, Island Filtration Plant, Centre Island, Toronto, Ont., Can. (May '33)

**Stewart, O. J.,** Supt., Water Works Dept., Greencastle, Ind. (Jan. '38) *A*

**Stewart, S. W.,** *see* Ambursen Engineering Corp.

**Stibbe, E. H.,** *see* Peshtigo Water Dept.

**Stickel, Chas. R.,** City Mgr., City Hall, Melbourne, Fla. (July '39)

**Stickney, E. M.,** *see* Mobile Water Works Dept.

**Stiemke, Robert E.,** Assoc. Prof. of San. Eng., Eng. Expt. Station, North Carolina State College, Raleigh, N.C. (Oct. '42) *P*

**Stiles, Arthur B.,** *see* Owego Water Works

**Stilson, Alden E.,** 44 Brunson Ave., Columbus, Ohio (July '44) *P* ★

**Stillwell, Howard L.,** 325 Second Ave., S.E., Atlanta, Ga. (Jan. '39) ★

**Stilwell, Robert L.,** Supt., Water Dept., Southern Indiana Gas & Elec. Co., Evansville, Ind. (July '35)

**Stimmel, R. M.,** Supt., Water Service, New York, Chicago & St. Louis R.R., Lima, Ohio (Apr. '30) *P*

**Stimpson, Theodore E.,** *see* Brunswick & Topsham Water Dist.

**Stinson, E. J. L.,** *Daily Commercial News & Building Record,* 65 Pearl St., Toronto 1, Ont., Can. (Apr. '42)

**Stober, A. W.,** Repr., Neptune Meter Co., 1238 N.W. Glisan St., Portland 9, Ore. (July '34)

**Stock, Harry,** Civ. Engr., 46th Ave., N.E., & Marshall St., R. 8, Box 352, Minneapolis 13, Minn. (Jan. '39)

**Stockman, R. C.,** Asst. Engr., c/o City Engr., San Diego, Calif. (Apr. '40) ★

**Stockner, L. J.,** Supt. of Filtration, Galax, Va. (Oct. '34)

**Stockwell, Henry P., Jr.,** Asst. Water Works Engr., Transportation Bldg., Ottawa, Ont., Can. (Jan. '33)

**Stokes, D. Birney,** Vice-Pres., U.S. Pipe & Foundry Co., Burlington, N.J. (Oct. '35)

**Stokes, Thos. M.,** Mgr. of Utilities, Box 167, Bastrop, Tex. (Oct. '43) *A*

**Stoldt, G. F.,** 518 N. Ewing St., Seymour, Ind. (Dec. '22) *MP*

**Stolk, Juan F.,** Gen. Mgr., Comp. Anonima de Estudios y Const. Agro Pecuarias, "Riego," Esquina Miracielos, Caracas, Venezuela S.A. (Jan. '36)

**Stolp, Amer C.,** Dist. Mgr., Visalia & Hanford, California Water Service Co., Box 48, Visalia, Calif. (Nov. '33)

**Stompler, Otto F.,** Supt., Langhorne Spring Water Co., Langhorne, Pa. (Jan. '26)

**Stone, K.,** Supt., City Water Dept., San Jacinto, Calif. (Jan. '44)

**Stone, Robert R.,** Supt. & Engr., Elizabethtown Water Co., Cons., 22 W. Jersey St., Elizabeth 4, N.J. (Jan. '39) *M*

**Stone, Wyman R.,** 98 Maple St., Athol, Mass. (Jan. '38) ★

**Storey, Alva Theron,** Chem. Technician, Atlanta Water Works, 1210 Hemphill Ave., N.W., Atlanta, Ga. (Jan. '44) *P*

**Storm, A. O.,** Trustee, City Water Works, 6 Oak St., Council Bluffs, Iowa (Jan. '39)

**Storm, E. W.,** Supt., Algoma Utility Com., Algoma, Wis. (Oct. '40) *M*

**Storrie, William,** Cons. Engr., Charles-Bay Bldg., 1130 Bay St., Toronto 5, Ont., Can. (Mar. '15) *Fuller Award '44. A*

**Story, O. F.,** Chief Engr., Portsmouth Water Dept., R.F.D. No. 3, Suffolk, Va. (Oct. '42) *MP*

**Stothoff, W. Luther,** Pres., W. Stothoff Co., Inc., Flemington, N.J. (Jan. '42)

**Stott, Roy,** Mgr., Light & Water Dept., Greenwood, Miss. (July '38) *M*

**Stouder, E. H.,** Supt., Water Works, Batavia, Ohio (Oct. '40)

**Stout, Edison O.,** Operator, Belle Center, Ohio (Jan. '41) *M*

**Stover, Frederick H.,** Chemist & Bacteriologist, Crescent Hill Filter, Louisville Water Co., Louisville, Ky. (June '12) *P* ★

**Stowe, Joe C.,** Supt., Hamlet Water Co., Hamlet, N.C. (Apr. '43) *MP*

**Strachan, D. G.,** Service Mgr., South Essex Water Works Co., Hornchurch Road, Romford, Essex, England (Jan. '34)

**Stradling, F. P.,** Asst. Mgr., East St. Louis & Interurban Water Co., Box 367, East St. Louis, Ill. (Dec. '24) *M*

**Straight, P. D.,** Jr. Officer of Sanitation, Federal Industrial Institution for Women, Box 58, Alderson, W.Va. (Affil. Jan. '39)

**Strang, John A.,** Div. Mgr., Wallace & Tiernan Sales Corp., 426 Board of Trade Bldg., Kansas City 6, Mo. (Feb. '23) *P*

**Strange, James A.,** R.F.D. No. 1, Box 674, Corvallis, Ore. (Jan. '39)

**Strasser, R. J.,** Owner, R. J. Strasser Drilling Co., R. 3, Box 594, Portland 6, Ore. (Jan. '39) *M*

**Strathroy Public Utilities Com.,** A. E. Ditchburn, Mgr., Strathroy, Ont., Can. (Corp. M. Feb. '32)

**Straub, Conrad P.,** U.S. Public Health Service, 15 Pine St., New York 5, N.Y. (Jan. '40) *P*

**Straughn, W. H.,** Supt., Constr. & Maint., Water & Sewers Dept., Post Engrs., Camp McCain, Miss. (Jan. '44) *P*

**Streander, Philip B.,** Cons. San. Engr., 532 Main St., Hingham, Mass. (Dec. '23) *P*

**Street, J. C.,** *see* Welland Board of Water Comrs.

**Streeter, Harold W.,** San. Engr. Director, U.S. Public Health Service, Office of Water Sanitation Investigations, E. 3rd & Kilgour Sts., Cincinnati, Ohio (Apr. '15) *P*

**Streeter, Robert L.,** Engr., Gillette, Wyo. (Apr. '37)

**Streicher, Lee,** Chief Chemist, Metropolitan Water Dist., 545 Cloverleaf Way, Monrovia, Calif. (Oct. '43) *P*

**Strickland, G. Hudson,** Supt. of Filtration Plant, Windsor Utilities Com., Canada Bldg., Windsor, Ont., Can. (Mar. '29) *P*

**Stringfield, V. T.,** Sr. Geologist, U.S. Geological Survey, Washington 25, D.C. (Apr. '43)

**Strobel, W. E.,** Supt., Sewer & Water Utility, Lomira, Wis. (July '44) *M*

**Strockbine, Walter,** 3433 Ryan Ave., Philadelphia 36, Pa. (June '27) *P*

**Strodthoff, G. J.,** *see* Lakewood Water & Power Co.

**Strohmeyer, Joseph S.,** Distr. Engr., Bureau of Water Supply, 3409 Dolfield Ave., Baltimore 15, Md. (May '22) *M*

**Stromquist, W. G.,** 82 S. Crest Rd., Chattanooga 4, Tenn. (May '32) *P*

**Stromsoe, Douglas A.,** *see* Southern Pipe & Casing Co.

**Strother, Bryant L.,** Filter Plant Supervisor, du Pont Rayon Co., Richmond 24, Va. (Jan. '35) *P*

**Stroyd, A. H.,** D. D. Foster Co., 412 Peoples Gas Bldg., Pittsburgh 19, Pa. (Jan. '41)

**Strudgeon, J. C.,** Supt., Parkrose Water Dist., 10404 N.E. Sandy Blvd., Portland 13, Ore. (July '35)

**Strutt, W. F.,** *see* Whitney, Township of

**Stuart, Archer B.,** *see* Healdsburg, City of

**Stuart, Fred E.,** Pres., Stuart-Brumley Corp., 516 N. Charles St., Baltimore 1, Md. (Oct. '31)

**Stuart, Linden,** *see* Wailes Dove-Hermiston Corp.

**Stuart-Brumley Corp.,** Fred E. Stuart, Pres., 516 N. Charles St., Baltimore 1, Md. (Assoc. M. Jan. '37)

**Stuttgart Munic. Water Works,** H. P. Stewart, Mgr., Stuttgart, Ark. (Corp. M. Apr. '43)

**Stutts, K. V.,** Operating Engr., Water Dept., Box 1172, McCamey, Tex. (Apr. '43) *AMP*

**Stutz, C. N.,** 1308 N. Rosney Ave., Bloomington, Ill. (July '35) *P*

**Suburban Water Co. (San Francisco),** Henry Cartan, Pres., 58 Sutter St., San Francisco, Calif. (Corp. M. Oct. '37)

**Suburban Water Co. (Verona),** A. G. Garvin, Vice-Pres., 748 Allegheny River Blvd., Verona, Pa. (Corp. M. Apr. '09)

**Sudhoff, Robert R.,** San. Engr. of Water Treatment, U.S. Engrs., Jeffersonville Quartermaster Depot, Jeffersonville, Ind. (Jan. '43) *P*

**Sudlow, Harry,** Supt. of Water Works, Aiken, S.C. (Apr. '30) *P*

**Sullivan, Charles J.,** Gen. Supt., Municipal Elec. Plant & Water Works, Village of Fairport, N.Y. (Apr. '44)

**Sullivan, Daniel M.,** Div. Engr. & Deputy Comr. of Water Dept., City Hall Annex, Boston 8, Mass. (July '41)

**Sullivan, George C.,** Prin. Engr., 2744 Temporary R Bldg., Washington, D.C. (Oct. '43) *MP*

**Sullivan, J. R.,** Mgr., Public Utilities Com., 524 Dundas St., Woodstock, Ont., Can. (Jan. '42) *AM*

**Sullivan, William F.,** *see* Pennichuck Water Works

**Susanke, M. P.,** Engr., Indiana Inspection Bureau, Chamber of Commerce Bldg., Indianapolis, Ind. (July '44)

**Sutcliffe, H. W.,** Cons. Engr., New Liskeard, Ont., Can. (July '35)

**Suter, Max,** Engr., State Water Survey, 405 W. Elm St., Urbana, Ill. (May '33) *P*

**Suter, Russell,** Exec. Engr., Water Power & Control Com., Albany 1, N.Y. (Oct. '14) *P*

**Suters, Frank,** Mgr., California Water Service Co., Box 471, Stockton, Calif. (Oct. '37) *M*

**Sutherland, Lois, (Miss),** *see* Paducah Water Works

**Sutherland, Oscar,** Supt., Water Dept., Box 473, Sioux City 3, Iowa (June '27) *M*

**Svenson, S. H.,** U.S. Pipe & Foundry Co., 2105 Bryant Bldg., Kansas City 6, Mo. (Apr. '37)

**Svore, Jerome H.,** Sr. San. Engr., State Health Dept., Bismarck, N.D. (July '43)

**Swab, Bernal H.,** 1319 Williamson Drive, Raleigh, N.C. (Mar. '30) ★

**Swanson, Herbert S.,** Hydrographer, Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34) ★

**Swanson, J. L.,** Water Purif. Supt., 2238—18th St., Port Arthur, Tex. (Oct. '39)

**Swanson, Joe,** Supt., City Water Dept., Sierra Madre, Calif. (July '42) *M*

**Swartz, Louis H.,** Supt. of Water, 22401 Ridgeway Ave., St. Clair Shores, Mich. (Apr. '44) *M*

**Swartz, Martin,** Supt., Greenville Utilities Com., Greenville, N.C. (Dec. '24) *P*

**Swartz, W. E.,** *see* Preston Light & Water Com. on Public Utilities

**Swearingen, C. V.,** Chief Chemist, City Water Co., Chattanooga 3, Tenn. (Jan. '24) *P*

**Sweeney, R. E.,** New England Sales Agent, U.S. Pipe & Foundry Co., 250 Stuart St., Boston 16, Mass. (July '39)

**Swingley, Ralph L.,** Chief Acct., Indianapolis Water Co., 113 Monument Circle, Indianapolis 6, Ind. (Jan. '40) *A*

**Swinney, Guy H.,** Chief Chlorine Plant Operator, Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '37)

**Switzer, Walter D.,** Dist. Repr., Darling Valve & Mfg. Co., Chillicothe Road, Aurora, Ohio (Apr. '44)

**Swope, H. Gladys, (Miss),** Research Chemist, Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Pa. (Jan. '44)

**Sybrandt, John L.,** Sales Repr., Ludlow Valve Mfg. Co., 7 S. Dearborn St., Chicago 3, Ill. (Apr. '34) *MP*

**Sydnor, Garland S.,** *see* East Coast Water Co.

**Sydow, William,** Director of Public Service, City of Miami, Box 1861, Miami 32, Fla. (July '38)

**Symonds, Allen M.,** Mgr., Water Utilities Service Corp., Southern New England Div., 114 Elm St., Millbury, Mass. (July '40) *M*

**Symons, George E.,** Assoc. Editor, *Water Works & Sewage*, 155 E. 44th St., New York 17, N.Y. (Jan. '32) *AMP*

**Syracuse Dept. of Engineering,** Div. of Water, Elon P. Stewart, Div. Engr., 400 City Hall, Syracuse 2, N.Y. (Corp. M. Jan. '23) *Fuller Award '39.*

**Taber, George A.,** Pres., Pennell, Dearborn & Hovey, Inc., 1000 N. Main St., Reading, Mass. (June '12) *A*

**Taggart, Robert S.,** 144 Market St., Amsterdam, N.Y. (Apr. '37) ★

**Tait, Robert S.,** Supt. of Water, 14 California St., Santa Cruz, Calif. (Oct. '25)

**Tait, Wm.,** Supt. of Water Works, Picton, Ont., Can. (Apr. '34)

**Taladay, J. H.,** Supt., Water Dept., Worthington, Ohio (July '43)

**Talbot, Earle,** Vice-Pres., Hackensack Water Co., 107 Booth Ave., Englewood, N.J. (May '20) *M*

**Tallant, Lee H.,** Water Supt., Estes Park, Colo. (Apr. '30)

**Talley, H. A.,** *see* McDonald, A. Y., Mfg. Co.

**Tallon, T. V.,** Plant Mgr., Dominguez Water Corp., 21718 S. Alameda St., Long Beach 6, Calif. (Jan. '43) *M*

**Tamer, Paul,** Chemist, Hacksensack Water Co., New Milford, N.J. (Jan. '39)

**Tangney, Frank P.,** Salesman, Pittsburgh Equitable Meter Co., 19 W. Thomas St., Seattle 99, Wash. (July '35)

**Tankard, Ernest E.,** Supt., Berlin Water Works, 292 Prospect St., Berlin, N.H. (Jan. '42)

**Tanner, Clair D.,** *see* Holland Water Dist. No. 1

**Tappen, Ray,** Supt., Jericho Water Dist., Box 434, Glen Head, N.Y. (July '38)

**Tarbell, W. P.,** City Engr., Box 185, Fargo, N.D. (Feb. '28)

**Tarbett, R. E.,** San. Engr. Director, U.S. Public Health Service, Bethesda Station, Washington 14, D.C. (July '21) *P*

**Tarlton, Ellis Alvord,** 34 Pleasant St., Danbury, Conn. (Apr. '39) *P*

**Tarr, Earle A.,** Supt., Water Dist., Winthrop, Me. (Apr. '43)

**Tarr, Jesse,** Chemist in Charge of Filtration, Wellsville Water Dept., 806 Main St., Wellsville, Ohio (Oct. '39)

**Tarshis, M. A.,** *see* Interstate Lead Corp.

**Tassie, Gilbert C.,** R.R. 2, Coldstream, Vernon P.O., B.C., Can. (Oct. '38) *M*

**Tate, Guy M.,** San. Engr., Jefferson County Health Dept., Box 2591, Birmingham, Ala. (Oct. '39) ★

**Tate, H. L.,** Sr. Operator, Redlands City Water Dept., Mentone, Calif. (Oct. '38)

**Tate Pipe Linings, Inc.,** Bruce Harkness, 47 Haverhill St., Andover, Mass. (Assoc. M. Jan. '38)

**Tate, R. H.,** Supt., Water & Sewer Depts., Jacksboro, Tex. (Apr. '43)

**Tatnall, George,** Hydr. Engr., National Board of Fire Underwriters, 222 W. Adams St., Chicago 6, Ill. (Feb. '30) *M*

**Taulman, W. D.,** 610 Red Rock Bldg., Atlanta 3, Ga. (July '35)

**Tavistock Public Utilities Com.,** Harry Hitzeroth, Chairman, Tavistock, Ont., Can. (Corp. M. July '41)

**Tawney, Albert M.,** Assoc. San. Engr., U.S. Corps of Engrs., Army Service Forces, 3rd Service Command, Office of Post Engr., Fort George G. Meade, Md. (July '35)

**Tay, Samuel Wright,** San. Engr., Holualoa, T. H. (July '20)

**Taylor, Alva A.,** Area Planning Engr., Federal Public Works Reserve, 1612 Appleton St., Long Beach, Calif. (Oct. '39) ★

**Taylor, D. C.,** Office Mgr., Windsor Utilities Com., Water Div., 606 Canada Bldg., Windsor, Ont., Can. (Jan. '35) *A*

**Taylor, D. R.,** Supt., 20 Salem Ave., E., Roanoke, Va. (Sept. '33) *Fuller Award '42. M* ★

**Taylor, Floyd B.,** 1st Lt., Sn.C., Station Hospital, Fort Belvoir, Va. (July '39) ★

**Taylor, Frank S.,** Filtration Engr., Water Dept., Municipal Bldg., Oklahoma City 2, Okla. (Apr. '41) *MP*

**Taylor, Geo. R.,** San. Chemist, 135 Jefferson Ave., Scranton 3, Pa. (May '08) *P*

**Taylor, Harold G.,** Dist. Mgr., The Permutit Co., 307 Essex Bldg., Minneapolis 2, Minn. (Jan. '44)

**Taylor, Harry,** Civ. Engr., Dept. of Water Supply, Gas & Elec., 605 Municipal Bldg., Brooklyn, N.Y. (July '44)

**Taylor, John F.,** *see* Pinehurst, Inc.

**Taylor, Ross,** City Mgr., City Hall, Bartlesville, Okla. (Oct. '43)

**Taylor, Roy A.,** Gen. Partner, Layne-Texas Co., Ltd., 3903 Elm St., Dallas 1, Tex. (Oct. '39)

**Taylor, Warren C., Prof.** of Civ. Eng., Union College, Schenectady 8, N.Y. (Oct. '24) *P*

**Teasleef, Claude V.,** Supt., Water Works, Dugger Utilities, Dugger, Ind. (Oct. '42)

**Technical Assn. Pulp & Paper Industry,** Lewis B. Miller, Chairman, Water Com., 245 Forrest Ave., Ambler, Pa. (Corp. M. Apr. '41)

**Teck, Township of,** F. G. Browne, Supt. of Water Works, Kirkland Lake, Ont., Can. (Corp. M. Feb. '32)

**Teece, Carleton P.,** Supt. of Pumping, Passaic Valley Water Com., Pumping & Generating Station, Little Falls, N.J. (Oct. '43)

**Teed, R. H.,** *see* Hot Springs Water Co.

**Tempest, W. F.,** *see* Portland Cement Assn.

**Tennessee Eastman Corp.,** John Callan, Kingsport, Tenn. (Corp. M. Jan. '39)

**Tenney, Ralph C.,** Pres. of City Council, Water Com., City Hall, Bellingham, Wash. (Affil. Jan. '42) *A*

**Tenny, M. K.,** Asst. to Gen. Mgr., Des Moines Water Works, 10th & Locust Sts., Des Moines 7, Iowa (Feb. '27)

**Ternent, A.,** Water Comr., 83 De Forest Rd., Swansea, Ont., Can. (Apr. '43)

**Terrill, James G., Jr.,** Office of Malaria Control in War Areas, 605 Volunteer Bldg., Atlanta, Ga. (Apr. '44) *P*

**Terry, Bert L.,** Supt., Shoshone, Idaho (Apr. '44) *M*

**Tessier, A. H.,** Dist. Mgr., International Water Supply, Ltd., 1414 University Tower, Montreal, Que., Can. (Jan. '37) *P*

**Tetzlaff, Frank,** 4606 Walsh St., Chevy Chase 15, Md. (Jan. '36)

**Texas Gulf Sulphur Co., Inc.,** J. W. Schwab, Assay Office, Newgulf, Tex. (Corp. M. Jan. '42)

**Texas Water Co.,** C. F. Alexander, Pres., 112 Baurline St., Fort Worth 3, Tex. (Corp. M. Jan. '42)

**Thacker, E. H.,** Asst. Supt., Meters & Services Dept., Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (Oct. '29)

**Thane, H. S.,** Valley Water Co., Hamilton, Mont. (Apr. '26) *Director '42–'45.*

**Thatcher, Glen,** Water Supt., Glenwood, Ind. (Apr. '44)

**Thayer, Halsey W.,** Supt. of Equipment, Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (Jan. '41) *M*

**Thayer, Neal B.,** *see* Elkhorn Light & Water Com.

**Theiss, Walter O.,** Water Plant Operator & Foreman, 137 S. Kirkwood Rd., Kirkwood, Mo. (Apr. '44)

**Theobald, Jerome J.,** Commercial Engr., Westchester Lighting Co., 9 S. First Ave., Mount Vernon, N.Y. (Mar. '34)

**Thiery, Frank J.,** Supt., Bristol Water Dept., 119 Riverside Ave., Box 1079, Bristol, Conn. (Jan. '43)

**Thoman, John R.,** Asst. San. Engr. (R), Typhus Control Unit, U.S. Public Health Service, 41 Exchange Place, Atlanta 3, Ga. (Jr. M. Jan. '41)

**Thomas, A. H. R.,** *see* New Toronto Public Utilities Com.

**Thomas, Ariel Alton,** 2420 S. 8th St., Springfield, Ill. (Jan. '38) ★

**Thomas, Brennan S.,** Engr., Water Dept., 215 W. Broadway, Long Beach, Calif. (Oct. '40) ★

**Thomas, Charles A.,** Member of Board, Dept. of Water & Sewers, 3536 Main Highway, Coconut Grove 33, Fla. (Apr. '42)

**Thomas, Charles F.,** Dist. Mgr., Pittsburgh Equitable Meter Co., 607 Iroquois Bldg., Buffalo 2, N.Y. (Apr. '37)

**Thomas, Charles O.,** Supt., Water & Light Plant, Hope, Ark. (Jan. '40) *M*

**Thomas, David S.,** Inspecting Engr., Board of Fire Underwriters of the Pacific, 1106 Second Ave., N., Great Falls, Mont. (Feb. '27) *Fuller Award '44.*

**Thomas, E. R.,** Supt., Munic. Water Dept., Burlington, N.C. (Jan. '36)

**Thomas, Edgar,** Supt., City Water Works, Box 205, Yreka, Calif. (June '27)

**Thomas, Edward C.,** San. Engr., Public Health & Welfare Dept., City Hall, Halifax, N.S., Can. (Apr. '44) *P*

**Thomas, F. B.,** Thomas Drain Service, 616 Sunset View Drive, Akron 2, Ohio (Apr. '40) *M*

**Thomas, Franklin,** Prof. of Civ. Eng., California Institute of Technology, Pasadena 4, Calif. (Mar. '30) *MP*

**Thomas, H. W.,** Pacific States Mgr., Badger Meter Mfg. Co., 2371 N. 30th St., Milwaukee, Wis. (Oct. '41)

**Thomas, J. A.,** *see* Roberts Filter Mfg. Co.

**Thomas, John L.,** Box 25, Smolan, Kan. (Jan. '44) *M*

**Thomas, Norton A.,** Chief Chemist, Milwaukee Water Works, 3000 N. Lincoln Memorial Drive, Milwaukee 11, Wis. (May '30) *P*

**Thomas R. M.,** *see* Rheem Mfg. Co.

**Thomas, Reynold,** *see* Harvey Cedars, Borough of

**Thomas, Richard Branson,** Prin. Engr., Water Div., Office of War Utilities, War Production Board, 1000 Mansion Drive, Silver Spring, Md. (Apr. '43)

**Thomas, T. W.,** The Peoples Water Co., Phillipsburg, N.J. (Apr. '36) *M*

**Thomason, W. H.,** Supt., Water & Light Dept., Sandersville, Ga. (Jan. '43)

**Thompsen, Albert,** Meter Shop Foreman, Munic. Water Dept., 3516 S. 47th Ave., Minneapolis, Minn. (Apr. '38)

**Thompson, B. M.,** Purchasing Agent, Southern California Water Co., 950 Bendix Bldg., Los Angeles 15, Calif. (Oct. '40) *M*

**Thompson, E. W.,** Northwestern Mgr., Neptune Meter Co., 1238 N.W. Glisan St., Portland 9, Ore. (Dec. '27)

**Thompson, H. E.,** *see* North Carolina, Univ. of

**Thompson, H. M.,** Mgr., Hercules Powder Co., Rhodes-Haverty Bldg., Atlanta 3, Ga. (Jan. '38) *P*

**Thompson, James B.,** Supt., Water Works, 413 Spring St., Toronto, Ohio (Apr. '44)

**Thompson, James Greer,** 292 Granada Ave., Long Beach, Calif. (Oct. '40)

**Thompson, John D.,** Hotel Onondaga, Syracuse 1, N.Y. (Oct. '29)

**Thompson, L. C.,** Supt. of Water Dept., Zebulon, N.C. (Jan. '43)

**Thompson, L. W.,** Supt., City Water Dept., 272 N. Cambridge St., Orange, Calif. (July '39)

**Thompson, Laura M.,** Secy.-Treas., Board of Water Comrs., Town Hall, Lindsay, Ont., Can. (July '44)

**Thompson, Leonard N.,** Gen. Supt. & Engr., Water Dept., St. Paul 2, Minn. (Apr. '29) *Director '36–'39. Vice-Pres. '45.*

**Thompson, Meredith H.,** Asst. San. Engr., Dept. of Health, State Div. of Sanitation, State Office Bldg., Albany 1, N.Y. (Jan. '43) *P*

**Thompson, N. J.,** Sales Mgr., Thompson Pipe & Steel Co., 3001 Larimer St., Denver 1, Colo. (Oct. '39) *P*

**Thompson, Nelson,** *see* Homelite Corp.

**Thompson, Robert B.,** Research Engr., The Dorr Co., Westport, Conn. (Apr. '44) *P*

**Thompson, Rudolph E.,** Deputy Director of Water Purif., Filtration Plant, 445 Parkside Drive, Toronto 3, Ont., Can. (Mar. '22) *P*

**Thompson, S. A.,** Chief Engr., Municipal Water Works, Burlington, Iowa (July '35)

**Thompson, Samuel H.,** Deputy Chief, Bureau of Water, 803 City Hall Annex, Philadelphia 46, Pa. (Apr. '42)

**Thompson, William W.,** Supt., Public Works, Manasquan, N.J. (Jan. '44)

**Thomson, J. A.,** Apdo. 1715, Havana, Cuba (Jan. '41) *P*

**Thomson, Medford T.,** Dist. Engr., U.S. Geological Survey, 3 N. Rhodes Center, Atlanta, Ga. (Oct. '41)

**Thomson Meter Co.,** R. K. Blanchard, Vice-Pres., 50 W. 50th St., New York 19, N.Y. (Assoc. M. Apr. '91)

**Thornburg, C. I.,** Pres., C. I. Thornburg Co., Inc., Box 1892, Huntington 17, W.Va. (Jan. '44) *P*

**Thorne, S. O.,** *see* Grinnell Co., Inc.

**Thornton, Gustavus,** Constr. Engr., Ford, Bacon & Davis, Inc., Box 148, Galveston, Tex. (Apr. '39)

**Thornton, J. S.,** *see* Federal Advisers, Inc.

**Thorpe, T. W.,** Chief Engr. & Gen. Mgr., Thorpe Well Co., Box 1376, Des Moines 5, Iowa (Oct. '34) *M*

**Thrasher, W. E.,** Gen. Supt., Westchester Joint Water Works No. 1, Mamaroneck, N.Y. (Jan. '37)

**Thuma, R. A.,** Supt., Filter Plant, Water Dept., R.F.D. No. 4, Dayton's Bluff P.O., St. Paul, Minn. (Mar. '25) *Director '41–'42. P* ★

**Thwaits, E. H.,** *see* American Iron & Steel Institute

**Tibbett, William M.,** San. Eng. Inspector, Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '43)

**Tiernan, Martin T.,** Sales Engr., Wallace & Tiernan Co., Inc., Roseland Ave., Essex Fells, N.J. (Jan. '41) ★

**Tighe, James L.,** Cons. Engr., 189 High St., Holyoke, Mass. (Apr. '89) *P*

**Tilbury Public Utilities Com.,** G. S. Richardson, Comr., Tilbury, Ont. Can. (Corp. M. Apr. '34)

**Tilford, William,** Supt., City Water Works Dept., Morganfield, Ky. (Jan. '43)

**Tillman, Martin,** Supt. of Filtration Plant, Box 671, Antioch, Calif. (Oct. '43) *P*

**Tillsonburg Public Utilities Com.,** S. Webster, Supt., Tillsonburg, Ont., Can. (Corp. M. Feb. '29)

**Timanus, C. S.,** Burns & McDonnell Engineering Co., 107 W. Linwood Blvd., Kansas City 2, Mo. (May '31) *M*

**Timmins, Corp. Town of,** J. D. MacLean, Town Engr., Town Hall, Timmins, Ont., Can. (Corp. M. Feb. '33)

**Timmons, Cyrus L.,** Sales Engr., W.D. Taulman & Assoc., 1463 Talbot Ave., Jacksonville, Fla. (July '43)

**Tingley, P. W.,** Dist. Engr., West Virginia Water Service Co., 814 Peoples Bldg., Charleston 1, W.Va. (Jan. '44)

**Tinniswood, W. W.,** *see* Idaho, Univ. of

**Tintle, John F.,** Clerk, Water Dept., Harrison, N.J. (Jan. '44) *M*

**Tischer, H. G.,** Mgr., Water-Gas-Sewage Disposal Dept., 414–16 W. 1st St., Duluth 2, Minn. (July '41) *M*

**Tobin, L. P.,** Supt. & Treas., Munic. Water & Light Dept., Camden, S.C. (Jan. '32)

**Todd, Arthur R.,** Supt. of Filtration & Chemist, Wheeling Water Dept., Water Works, Warwood, Wheeling, W.Va. (Apr. '34) *P*

**Todd, J. A.,** Supt., Water & Light Dept., City Hall, Kewanee, Ill. (July '41)

**Tolburg, H. A.,** 2020 S. 5th St., Springfield, Ill. (July '35) *M*

**Tolles, Frank C.,** Civ. & San. Engr., Leader Bldg., Cleveland 7, Ohio (Aug. '23) *P*

**Tolman, S. L.,** *see* Jeffrey Mfg. Co., The

**Tomahawk Munic. Water Utility,** William Krueger, Supt. of Water Dept., Tomahawk, Wis. (Corp. M. July '43)

**Toman, R. S.,** Chief Chemist, Chemical Equipment Co., 911 Harrison St., San Francisco 7, Calif. (Jan. '40) *P*

**Tomek, Arthur O.,** 5610—39th Ave., Hyattsville, Md. (Oct. '35)

**Tomlinson, W. J.,** Technical Director, Wood Industries Supply Co., Ltd., 2009 Royal Bank Bldg., Montreal, Que., Can. (July '38) *P*

**Tomlinson, W. S.,** City Engr., Columbia 3, S.C. (July '37)

**Tomme, E. M.,** Mgr. of Utilities, Box 391, Raymondville, Tex. (Oct. '43)

**Toms, J. H.,** Supt. of Filtration, Water Dept., 206 Lee St., Shelby, N.C. (Jan. '40)

**Toms, N. S.,** Cons. Engr., 25 Wetmore Ave., Morristown, N.J. (Apr. '43) *MP*

**Toms, R. C.,** Mgr., Marion Water Co., Marion, Iowa (Apr. '24)

**Tonawanda, Town of,** Alexander G. Martin, Councilman, 36 Kensey Ave., Kenmore 17, N.Y. (Corp. M. Apr. '44)

**Tonglet, Karel H.,** City Water Supt., City Hall, Monrovia, Calif. (Oct. '37)

**Topham, W. R.,** Chief Chemist, Electro Metallurgical Co., Alloy, W.Va. (Affil. Jan. '39)

**Toronto Dept. of Works,** R. C. Harris, Comr. of Works, City Hall, Toronto 2, Ont., Can. (Corp. M. Jan. '35)

**Totka, Vincent,** Mayor, 3617 E. Layton Ave., Cudahy, Wis. (Jan. '42) *A*

**Totman, W. A.,** *see* Sierra Pacific Power Co.

**Tournillon, Emile,** Eng. Supt., Servicos de Aguas e Esgotos, Salvador, Bahia, Brazil, S.A. (Apr. '43)

**Towne, James E.,** Supt., Water & Light Dept., North Forest St., Waupun, Wis. (Oct. '35) *M*

**Towne, W. W.,** Director, Div. of San. Eng., State Board of Health, Pierre, S.D. (Dec. '29) *P* ★

**Towns, J. E.,** Mgr., General Chemical Co., 3357 W. 47th Pl., Chicago 32, Ill. (Oct. '37) *P*

**Townsend, C. P.,** Supt., Water Works, Abbeville, S.C. (July '35)

**Townsend, Fred W.,** 2411 Ivanhoe Drive, Los Angeles 26, Calif. (Apr. '33) *P*

**Townsend, Hal C.,** 3341 Wiscasset Rd., Dearborn, Mich. (Jan. '38)

**Tracy, Harry W.,** Water Purif. Engr., San Francisco Water Dept., Millbrae, Calif. (Jan. '40) *P*

**Tracy, R. N.,** Civ. Engr., Hardesty Mfg. Co., Box 2170, Denver, Colo. (Jan. '35)

**Trainer, J. Hagan,** Supt., City Water Works, 306 Market St., Steubenville, Ohio (Apr. '42) *M*

**Trauger, George W.,** Supt. & Resident Engr., Lindsay-Strathmore Irrigation Dist., Lindsay, Calif. (Nov. '25)

**Travaini, Dario,** San. Engr., Eng. Dept., City Hall, Phoenix, Ariz. (July '40) *P*

**Traver, Leslie J.,** Supt. of Pumping Plant, East Bay Munic. Utility Dist., 512—16th St., Oakland, Calif. (May '33)

**Traverse City Iron Works,** William A. Royce, Pres., Traverse City, Mich. (Assoc. M. July '38)

**Travis, A. Raymond, Jr.,** 907 River Rd., Fair Haven, N.J. (Oct. '38)

**Travis, Archibald Joseph,** Water Works Supt., Drumheller, Alta., Can. (Jan. '41) *P*

**Travis, F. M.,** Chairman of the Board, Torrington Water Co., Box 87, Torrington, Conn. (July '17)

**Trax, E. C.,** Chemist, Filtration Plant, McKeesport, Pa. (June '11) *Fuller Award '39. Director '39–'41.*

**Treanor, Earl E.,** Supt. of Water, Hercules Powder Co., Sunflower Ordnance, Lawrence, Kan. (Jan. '44)

**Trelles, Rogelio A.,** Jefe de los Laboratorios, Obras Sanitarias de la Nacion, Ave. Pte. Figueroa Alcorta 5950, Buenos Aires, Argentina, S.A. (July '42)

**Tremblay, J. A.,** Water Works Engr., 98 Bougainville Ave., Quebec, Que., Can. (May '24)

**Trentlage, LaVerne,** Supt., Meter Div., Elgin City Water Dept., 353 Cooper Ave., Elgin, Ill. (Apr. '36) *M*

**Trenton, Ont., Public Utilities Com. of,** E. R. Smithrim, Mgr., Box 811, Trenton, Ont., Can. (Corp. M. Jan. '44)

**Trenton Water Works,** Geo. W. Page, Director, City Hall, Trenton 8, N.J. (Corp. M. May '09)

**Trimble, Earle J.,** *see* Ilion Board of Water Comrs.

**Trimble, Roswell D.,** R. D. Trimble & Co., Cons. & Constr. Engrs., R.F.D. 13, Richmond 21, Va. (July '37)

**Tripp, Garner C., Jr.,** Assoc. Engr., Whitman, Requardt & Assoc., 11 N. Pearl St., Albany, N.Y. (Jan. '41) ★

**Trostle, N. E.,** Water Supt. & City Engr., Temple Water Dept., 1314 S. 21st St., Temple, Tex. (Oct. '42) *P*

**Trout, Clarence L.,** Gen. Foreman, Harrison Elec. & Water Co., 323 Plum St., Cincinnati, Ohio (Jan. '39)

**Trout, Fred I.,** Supt., Water & Light Dept., Tupelo, Miss. (July '44) *M*

**Trow, Raymond B.,** Mgr., Houston Branch Office, Ludlow Valve Mfg. Co., Inc., 2615 Fannin St., Houston 4, Tex. (Jan. '43)

**Trowbridge, A. L.,** Mgr., California Water Service Co., 1417—17th St., Bakersfield, Calif. (Jan. '42) *M*

**Trowbridge, Charles E.,** American Water Works & Elec. Co., 50 Broad St., New York 4, N.Y. (Mar. '29)

**Troy Bureau of Water,** William Luby, Troy, N.Y. (Corp. M. May '24)

**Trubnick, Eugene,** Capt., Sn.C., Medical Inspector, Station Hospital, Stout Field, AAB, Indianapolis 6, Ind. (Apr. '44) *P* ★

**True, Albert O.,** San. Engr., Denim Branch, Proximity Mfg. Co., Greensboro, N.C. (Aug. '22)

**Truesdale, William,** Supt. of Water Works, Victoria Ave., Essex, Ont., Can. (Jan. '37)

**Truman, Chester A.,** 1628 N. Nevada Ave., Colorado Springs, Colo. (Dec. '26) *Director '37–'40.*

**Trygg, Charles E.,** 219 Riverview, Iowa City, Iowa (Jr. M. Oct. '42)

**Tucker, R. D.,** *see* Crossett Public Utilities Co.

**Tudor, T. Clifford,** Water Engr., B. F. Goodrich Co., Port Neches, Tex. (Jan. '41) *MP*

**Tuggle, H. G.,** Director of Sanitation, Memphis-Shelby County Health Dept., 879 Madison Ave., Memphis 3, Tenn. (Jan. '42)

**Tull, E. R.,** Supt., Water Dept., Rockingham, N.C. (Jan. '35)

**Tuller, W. N.,** Freeport Sulphur Co., Port Sulphur, La. (Jan. '43)

**Tullgren, Ralph R.,** Jr. San. Engr., Water Purif. Div., Dept. of Public Works, 6843 S. Oglesby Ave., Chicago 49, Ill. (Apr. '44) *P*

**Tulsa Water Dept.,** City Hall, Tulsa 3, Okla. (Corp. M. June '29)

**Tumpeer, Joseph J.,** *see* Pioneer Asphalt Co.

**Tupper Lake Munic. Water System,** B. N. Sparks, Mgr., 93 Park St., Tupper Lake, N.Y. (Corp. M. Oct. '42)

**Turner, A. J.,** *see* Washington Water Power Co.

**Turner, Arthur W.,** Repr., Hays Mfg. Co., 4011 Trask Ave., Erie, Pa. (Jan. '44)

**Turner, C. H.,** Service Engr., Calgon, Inc., 811 Red Oak St., Charleston 2, W.Va. (Oct. '43)

**Turner, Charles D.,** Dist. Mgr., Wailes Dove-Hermiston Corp., 401 N. Broad St., Philadelphia 8, Pa. (Apr. '37)

**Turner, E. S.,** Sales Engr., Wm. S. Turner & Co., 618 Pacific Bldg., Portland 4, Ore. (Apr. '44)

**Turner, Homer G.,** Research Engr., State College, Pa. (Sept. '32) *P*

**Turner, James V.,** Supt., East Providence Water Dept., Rumford 16, R.I. (July '38)

**Turner, M. C.,** Supt., Conway Water Works, Box 670, Conway, Ark. (Oct. '42) *MP*

**Turner, Marvin,** Design Engr., Water Dept., 206 Municipal Bldg., Box 1160, Austin 4, Tex. (Oct. '40) *M*

**Turner, W. D.,** Prof. of Chem. Eng., Columbia Univ., New York 27, N.Y. (May '31) *P*

**Turner, William H.,** Sales Engr., Eagle Metals Co., 3628 E. Marginal Way, Seattle, Wash. (Apr. '43)

**Turping, J. P.,** Mgr., Armstrong Water Co., 204 Arch St., Kittanning, Pa. (Affil. July '39) *M*

**Turre, George J.,** San. Engr., Board of Water Comrs., Box 629, Denver 2, Colo. (Nov. '27) *P*

**Tuscaloosa, City of,** C. S. Read, Supt. of Water Works, Tuscaloosa, Ala. (Corp. M. Jan. '35)

**Tuttle, Arthur L.,** Supt., Danville City Water Works, Box 346, Danville, Ky. (Jan. '41)

**Twining, R. H., Mgr.,** Development Dept., The Gray Chemical Co., Roulette, Pa. (Oct. '38) *P*

**Two Harbors, City of,** Carl F. Barr, Supt. of Utilities, Two Harbors, Minn. (Corp. M. Apr. '39)

**Twohy, Frank,** Asst. Controller, Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '43) *A*

**Tygert, Cyril B.,** Dist. Mgr., Wallace & Tiernan Co., Inc., Box 178, Newark 1, N.J. (Oct. '35)

**Tyldesley, Thomas B.,** Supt., Watertown Water Dept., City Hall, Watertown, N.Y. (Jan. '41) *M*

**Tyler, Arthur R.,** Engr. & Supt., Suburban Water System, 405 City Hall, Honolulu, T.H. (July '42)

**Tyler, O. Z.,** Gen. Supt., Elec. & Water Depts., Utilities Bldg., Jacksonville 2, Fla. (Jan. '27)

**Tyler, Ralph L., Mgr.,** New Jersey Div., Water Utilities Service Corp., 1 Morgan Ave., Palmyra, N.J. (Jan. '37) *M*

**Tyler, Richard G.,** College of Eng., Univ. of Washington, Seattle 5, Wash. (Feb. '31) *P*

**Uban, Carlos Gonzalez,** Chief Engr. of Public Works, Ificina de Obras Publicas, Valera, Estado, Trujillo, Venezuela, S.A. (Apr. '40)

**Uhl, William F.,** 59 E. Troy Ave., Indianapolis, Ind. (Oct. '41) ★

**Uline, B. A.,** Secy. & Gen. Mgr., Nappanee Utilities Co., Nappanee, Ind. (Apr. '42) *A*

**Ullrich, A. H.,** Chem. Engr., Water Dept., Fort Smith, Ark. (Oct. '35) *MP*

**Ulrich, A. A.,** Mgr., Massillon Div., Ohio Water Service Co., 161 Lincoln Way, E., Massillon, Ohio (June '31)

**Ulrich, J. W.,** Supt. of Utilities, Public Utilities Com., New Ulm, Minn. (Apr. '44) *M*

**Umbenhauer, Elwood J.,** Acting Supt., Dept. of Water & Sewerage, Box 511, El Paso, Tex. (Oct. '35)

**Underwood, Golden,** Supt., Parkersburg Water Dept., City Bldg., Parkersburg, W.Va. (Oct. '38)

**Underwood, J. E.,** Cons. Engr., 502 Grain Bldg., Saskatoon, Sask., Can. (Jan. '37) *P*

**Underwood, Lyle T.,** Supt., Water Dept., Municipal Bldg., Little Valley, N.Y. (Jan. '41) *M*

**Updegraff, Winston R.,** *see Western City*

**U.S. Pipe & Foundry Co.,** Thomas Simons, Southern Sales Mgr., 1711 American-Traders Bank Bldg., Birmingham 3, Ala. (Assoc. M. Nov. '29)

**U.S. Pipe & Foundry Co.,** H. Lloyd Nelson, Eastern Sales Mgr., 1624 Lincoln-Liberty Bldg., Broad & Chestnut Sts., Philadelphia 7, Pa. (Assoc. M. June '92)

**Universal Construction Co.,** 1158 W. 34th St., Indianapolis 8, Ind. (Assoc. M. Apr. '41)

**Universal Gear Corp.,** 19th & Martindale Ave., Indianapolis 7, Ind. (Assoc. M. May '34)

**Upton, G. P.,** *see* Randleman, City of

**Urton, J. R.,** Supt., Water Works, Box 21, Carlisle, Ark. (Oct. '43)

**Uslar, Carlos Suhr,** Civ. Engr., Instituto Nacional de Obras Sanitarias, Ministerio de Obras Publicas, Div. de Analisis de Aguas, Caracas, Venezuela, S.A. (Jan. '44)

**Utah State Dept. of Health,** Howard M. Hurst, Director, Div. of Public Health Eng. & Sanitation, 130 State Capitol, Salt Lake City 1, Utah (Corp. M. Jan. '42)

**Vaaler, Adrian W.,** Civ. Engr., 861 Willamette St., Eugene, Ore. (Apr. '43) *P*

**Vail, H. P.,** Engr., Metropolitan Water Dist., 306 W. 3rd St., Los Angeles 13, Calif. (Oct. '39) *MP*

**Valazquez, Jose Mendez,** *see* Mexico, Banco Nacional Hipotecario Urbano y de Obras Publicas, S.A.

**Valdese Water Works,** Frank W. Pons, Asst. Treas., Valdese, N.C. (Corp. M. Oct. '42)

**Valentine, Edward H.,** Supt. of Works, City & Dist. of N. Vancouver Public Works, City Hall, North Vancouver, B.C., Can. (Oct. '43) *P*

**Vallee, Antonio,** San. Engr., Public Health Service, Apdo. 1442, Havana, Cuba (July '38)

**Vallejo Water Co.,** J. H. Dieckmann, Jr., Secy., 110 Sutter St., San Francisco 4, Calif. (Corp. M. Jan. '41)

**Van Arnum, William I.,** Chem. Engr., Mahoning Valley Sanitary Dist., 402 Glenwood Ave., Youngstown, Ohio (Feb. '22)

**Van Benschoten, Jay,** Highland Stamping & Mfg. Co., Ltd., 1732 Berkeley St., Santa Monica, Calif. (June '23)

**Van Blarcum, B. H.,** City Engr. & Water Supt., City Hall, Manhattan, Kan. (Apr. '44)

**Van Brunt, J. K.,** Boro Supt., 25 Union Ave., Manasquan, N.J. (July '38)

**Van Burek, Robert,** Toronto Dist. Mgr., Wallace & Tiernan, Ltd., 350 Sorauren Ave., Toronto 3, Ont., Can. (Jan. '44) *P*

**Van Camp, Paul M.,** Cons. Engr., Southern Pines, N.C. (Nov. '31) *P*

**Van Den Berg, C., Jr.,** Watts Bldg., Birmingham, Ala. (Apr. '27)

**Van Deusen, E. J.,** Supt., Village Water Works, 21 Pearl St., Malone, N.Y. (Feb. '25) *M*

**VanDusen, Dana,** Vice-Gen. Mgr., Metropolitan Utilities Dist., Utilities Bldg., 18th & Harney Sts., Omaha 2, Neb. (Jan. '44) *A*

**Van Frachem, William,** *see* Allouez Water Dept.

**Van Gelder, John M.,** Field Engr., Wallace & Tiernan Co., Inc., 2125 Ramsey Ave., Dallas 16, Tex. (Oct. '39) *P*

**Van Gilder, L.,** Engr. & Supt., Water Dept., City Hall, Atlantic City, N.J. (July '06) *Fuller Award '40. M*

**Van Liew, Wm. M.,** Water Supt., Okanogan, Wash. (Dec. '28)

**Van Loan, Seth M.,** Water Works Improvement Project, City Hall Annex, Philadelphia, Pa. (May '14) *Trustee '28–'30. Director '33–'36. Fuller Award '43.*

**Van Meter, Roy O.,** San. Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '32) *MP*

**Van Norman, Claude H.,** Sales Repr., Johns-Manville Sales Corp., 1207 Architects Bldg., Los Angeles, Calif. (Oct. '38) ★

**Van Norman, D. M.,** Supt. of Equipment, Dept. of Water & Power, 410 Ducommun St., Los Angeles 12, Calif. (July '42)

**Van Norman, H. A.,** *see* Los Angeles Dept. of Water & Power

**Van Sleen, Robert,** *see* Gastonia, City of

**Van Pelt, Richard,** Assoc. San. Engr., Post Engrs., Camp Beale, Calif. (Apr. '43) *MP*

**Van Praag, Alex, Jr.,** Vice-Pres. & Secy., Warren & Van Praag, Inc., 447 Standard Office Bldg., Decatur 12, Ill. (Jan. '38) *MP*

**Van Reenen, W. J.,** Box 4519, Jacksonville 1, Fla. (Jan. '39) *P*

**Van Trump, S. N.,** Wilmington Suburban Water Co., Bellevue, Del. (July '35)

**Van Zandt, W. K.,** Asst. to Public Works Officer, U.S. Navy Yard, Philadelphia, Pa. (Apr. '42) ★

**Vance, L. S.,** Chief Engr. & Supt., Louisville Water Co., 435—3rd St., Louisville, Ky. (Apr. '38) *Fuller Award '38. M* ★

**Vannoy, F. R.,** 529 E. Center St., Madisonville, Ky. (Jan. '38)

**Vaseen, V. A.,** Lt., Asst. San. Engr., Station Hospital, Craig Field, Selma, Ala. (Jan. '44) *MP* ★

**Vaughan, E. A.,** *see* Lompoc Light & Water Dept.

**Vaughan, J. L.,** Supt., Water Dept., Box 397, Pendleton, Ore. (Jan. '37) *M*

**Vaughn, J. C.,** Supt. of Filtration & Pumping, Dept. of Water Works, 5941 Calumet Ave., Hammond, Ind. (Jan. '36) ★

**Veader, E. F.,** Dist. Mgr., West Virginia Water Service Co., Charleston 5, W.Va. (Mar. '29) *M*

**Veale, F. J.,** Supt. of Water Works, Hamilton, Ont., Can. (Jan. '31) *M*

**Veatch, N. T.,** Cons. Engr., 4706 Broadway, Kansas City 2, Mo. (Dec. '15) *Director '41–'44. M*

**Veggeberg, J. M.,** Sr. Filtration Designer, Bureau of Eng., 1006 City Hall, Chicago 2, Ill. (July '41) *P*

**Velloso, Frederico A. L.,** Servicos de Aguas e Esgotos, Salvador, Bahia, Brazil, S.A. (Jan. '43)

**Velz, C. J.,** Prof. of San. Eng., Manhattan College, Spuyten Duyvil Parkway, New York 63, N.Y. (Jan. '35)

**Velzy, Charles R.,** 22 Earlwood Drive, White Plains, N.Y. (Apr. '37) *P*

**Ventura City Water System,** Chas. F. Zapf, Supt., Box 1010, Ventura, Calif. (Corp. M. Jan. '36)

**Vermeule, Cornelius C.,** Civ. Engr., 74 S. Munn Ave., East Orange, N.J. (June '09)

**Vernon, City of,** Francis Bates, City Engr., 4305 Santa Fe Ave., Vernon 11, Calif. (Corp. M. Jan. '37)

**Verona, Pa.,** *see* Suburban Water Co.

**Vest, W. E.,** Supt. of Water Works, Charlotte 2, N.C. (May '11) *Director '30–'31. Honorary M. '42.*

**Vicentini G., Jorge,** San. Engr., Ministerio de Obras Publicas, Apdo. 304, Caracas, Venezuela, S.A. (Jan. '39)

**Vicini, H. C.,** Dist. Supt., Southern California Water Co., 1718 Main St., Venice, Calif. (Jan. '40) *M*

**Vicker, Harold A.,** Chief Engr., Scranton-Spring Brook Water Service Co., 135 Jefferson Ave., Scranton 3, Pa. (Jan. '43) *M*

**Vickerman, H. N.,** *see* Acadia Synthetic Products Div.

**Vickrey, John U.,** Sewage Disposal Plant Operator, 608 S.W. 7th Ave., Fort Lauderdale, Fla. (July '39)

**Victory, T. M.,** Apdo. 1715, Havana, Cuba (Jan. '41)

**Vieno, R. R.,** Supt., Dist. Water Dept., City Hall, Beaumont, Tex. (July '38) *M*

**Villa, Miguel,** Cons. Engr. & Prof., Univ. of Havana, Manzana de Gomez 334, Havana, Cuba (Jan. '42)

**Villa-Acosta, Alfonso,** Civ. Engr., Mier y Pesado 222, Mexico, D. F., Mexico (Apr. '30)

**Villarruz, Primo,** California Water Service Co., 374 W. Santa Clara St., San Jose 8, Calif. (Feb. '32) *P*

**Villemure, J. Phileas,** Supt. of City Works, Grand'mere, Que., Can. (Apr. '41)

**Vincent, Gordon G.,** Mgr., Tech. Service Dept., General Chem. Div., Canadian Industries, Ltd., Box 10, Montreal, Que., Can. (Jan. '44)

**Vineland Water Dept.,** Howard M. Down, Treas. & Business Mgr., 6th & Wood Sts., Vineland, N.J. (Corp. M. July '43)

**Vinick, Albert G.,** *see* East Chicago Dept. of Water Works

**Vinson, A. T.,** Pres., Vinson Specialty Paint Co., Burgess Bldg., Jacksonville 2, Fla. (Apr. '42)

**Voden, Stewart,** Chemist, Great Falls Water Works, 1405—7th Ave., S., Great Falls, Mont. (Jan. '39) *MP*

**Voelker, Eugene J.,** *see* Lake, Town of, Water Utility Board

**Vogel, F. C.,** *see* National Automatic Sprinkler Assn.

**Vogt, E. L.,** *see* Vogt Mfg. Co.

**Vogt Mfg. Co.,** E. L. Vogt, Box 1122, Louisville 1, Ky. (Assoc. M. May '25)

**Voland, J. A.,** *see* Golden-Anderson Valve Specialty Co.

**Volk, Kenneth Q.,** Cons. Engr., 176 N. Highland Ave. Los Angeles 36, Calif. (Oct. '26) *MP*

**Volpp, A. G.,** Water Supt., West Linn, Ore. (Apr. '39) *M*

**Von Scheidt, J.,** Personnel Director, Hackensack Water Co., 4100 Park Ave., Weehawken, N.J. (Oct. '42)

**Voorhees, George G.,** Water Supt., Brielle, N.J. (Oct. '37)

**Vos, Chas.,** Asst. Supt., Board of Public Works, 97 W. 19th St., Holland, Mich. (July '41)

**Vosburgh, James C.,** Mgr., Washington, D.C., Office, Chicago Bridge & Iron Co., 330 Bowen Bldg., 821—15th St., Washington 5, D.C. (Apr. '44)

**Vroomaa, Morrell,** Cons. Civ. Engr., Gloversville, N.Y. (June '13) *P*

**Waddell, W. H.,** Supt., Water Dept., City Hall, Owen Sound, Ont., Can. (July '35) *M*

**Waddington, Arthur H.,** Chemist & Bacteriologist, 23 Torver Rd., Harrow, Middlesex, England (June '34)

**Wade, Baxter F.,** Supt., Water Dept., City Hall, Jackson 101, Miss. (Jan. '43) *M*

**Wade, G. R.,** *see* Long Beach Water Dept.

**Wade, Newton B.,** City Engr., 228 E. Main St., Millville, N.J. (Oct. '42) *MP*

**Wafer, Joseph M.,** Industrial Chemical Sales Div., 230 Park Ave., New York 17, N.Y. (Jan. '37) *P*

**Wagener, August H.,** Comr., Dept. of Public Works, 54 Court St., Rochester 4, N.Y. (Jan. '44) *M*

**Wagenhals, H. H.,** Assoc. San. Engr., State Dept. of Health, 411 Herald Bldg., Syracuse 2, N.Y. (July '37)

**Wager, C. L.,** Postmaster, Heflin, Ala. (Affil. Jan. '40)

**Wages, R. E.,** Supt. of Water Works, Springdale, Ark. (Jan. '36)

**Wagner, A. H.,** Supt., Public Water Works Dist. No. 2, 119 E. Abriendo Ave., Pueblo, Colo. (Mar. '28)

**Wagner, C. F.,** Mgr., Oregon Insurance Rating Bureau, Box 70, Portland 2, Ore. (Nov. '25)

**Wagner, E. G.,** Public Health Engr., Div. of Sanitation, State Dept. of Health, University Campus, Minneapolis, Minn. (May '42) ★

**Wagner, Edward P.,** Civ. & San. Engr., 55 W. 42nd St., New York 18, N.Y. (Jan. '37) ★

**Wagner, Edwin B.,** Supt. of Water Works, Downingtown, Pa. (Apr. '21) *P*

**Wagner, Henry F.,** Chief Chemist, Div. of Water, Buffalo, N.Y. (May '14)

**Wagner, Richard E.,** Pres., Zeolite Chemical Co., Church Rd., Medford, N.J. (July '37)

**Wagner, Richard F.,** Director of Public Works, Lynchburg, Va. (Nov. '19) ★

**Wailes Dove-Hermiston Corp.,** Linden Stuart, Pres., Westfield, N.J. (Assoc. M. Mar. '25)

**Waite, Harry E.,** *see* San Fernando Water Dept.

**Waite, Howard,** Engr., 3727 Arbolada Rd., Los Angeles 27, Calif. (Apr. '40)

**Wake Forest, Town of,** O. M. McKanghan, Supt. of Public Works, Box 508, Wake Forest, N.C. (Corp. M. Jan. '42)

**Walasyk, Edward,** Asst. Engr., Hackensack Water Co., 217 Hudson Pl., Cliffside Park, Hudson Heights, N.J. (Apr. '43) *M*

**Walbert, C. C.,** Mgr., Batesville Water Co., Inc., Batesville, Ark. (Jan. '43) *MP*

**Waldeck, Kenneth,** Operator, Potomac Light & Power Co., Sheperdstown, W.Va. (Affil. Jan. '39)

**Walker, Carl C., Sr.,** Cons. Engr., The Jennings-Lawrence Co., 538 Rowlands Bldg., Columbus 15, Ohio (Jan. '24) *P*

**Walker, Charles L.,** Prof. of San. Eng., Cornell Univ., Ithaca, N.Y. (May '30) *P*

**Walker, Edward L.,** Asst. Hydr. Engr., Public Service Com., 233 Broadway, New York 7, N.Y. (Jan. '34)

**Walker, H. S.,** *see* Detroit Edison Co., The

**Walker, Lewie D.,** Water Works Engr., Canadian Underwriters' Assn., Metropolitan Bldg., Toronto, Ont., Can. (Feb. '21)

**Walker, Merton G.,** Chief Chemist, Hiram Walker & Sons, Inc., Peoria 1, Ill. (Jan. '39)

**Walker, Ray E.,** Asst. Water Supt., Water Dept., San Fernando, Calif. (Oct. '43)

**Walker, Vernon L.,** 325 N. Commonwealth, Elgin, Ill. (July '42) ★

**Walker, Walter E.,** Chief Engr., Water Works, North Rd., Poughkeepsie, N.Y. (Mar. '29) *MP*

**Wall, Harold M.,** Supt., Water Dept., Atlas Powder Co., Kentucky Ordnance Works, Paducah, Ky. (Jan. '44) *M*

**Wall, V. M.,** National Cast Iron Pipe Co., Box 2542, Birmingham, Ala. (Oct. '29)

**Wallace, Idaho,** *see* Citizens Utilities Co.

**Wallace, Joseph A.,** *see* Oswego Dept. of Water

**Wallace & Tiernan Co., Inc.,** Box 178, Newark 1, N.J. (Assoc. M. Apr. '15)

**Wallace, Donald S.,** Dist. Engr., U.S. Geological Survey, Box 1338, University Station, Charlottesville, Va. (May '34) *P*

**Wallace, William M.,** Supt. of Filtration, Water Works Park, Detroit 14, Mich. (Apr. '22)

**Wallaceburg Water Com.,** S. B. Bennett, Supt., Wallaceburg, Ont., Can. (Corp. M. Apr. '34)

**Wallis, J. A.,** Supt., Water Works, Malvern, Ark. (Jan. '42) *M*

**Wallis, L. E.,** Supt., Water & Light Dept., Elberton, Ga. (Feb. '33) *MP*

**Walsh, Thomas D.,** Supt., Winsted Water Works, 27 Elm St., Winsted, Conn. (Jan. '42) *M*

**Walsh, Zelma Q., (Miss),** Chemist, Water Dept., c/o Post Engr., Camp Butner, N.C. (Jr. M. Oct. '42)

**Walters, F. Y.,** *see* Inglis, John, Co., Ltd.

**Walters, Grover L.,** Supt. of Water Works, 237 W. Commonwealth, City Hall, Fullerton, Calif. (Oct. '30) *AM*

**Walthall, J. D.,** Supt., Light & Water Dept., Homer, La. (Oct. '43)

**Walton, Graham,** FPHA, Region X, 785 Market St., San Francisco 3, Calif. (Jan. '41) *P*

**Walvoord, D. J.,** Big Timber, Mont. (Jan. '36) *M*

**Wamsley, Robert,** Supt. of Water Plant, Climax Molybdenum Co., Climax, Colo. (July '42) *MP*

**Wang, Sigmund,** Mgr. of Labs., Canadian International Paper Co., Hawkesbury, Ont., Can. (Jan. '39)

**Wangaard, Oscar H.,** Civ. Engr., Minneapolis Water Works, 3145 Elliot Ave., Minneapolis, Minn. (Jan. '43)

**Ward, C. E.,** *see* Silver City Water Dept.

**Ward, Clayton N.,** 1835 Rowley Ave., Madison, Wis. (June '30)

**Ward, Joe E.,** Cons. Engr., 545 Harvey-Snider Bldg., Wichita Falls, Tex. (June '26) *MP*

**Ward, R. E.,** 302 Hildebrandt Bldg., Jacksonville 2, Fla. (July '35) *P*

**Ward, R. V.,** *see* San Bernardino County Flood Control Dist.

**Ward, Sylvester Edward,** Asst. to Engr., Elizabethtown Water Co., Cons., 22 W. Jersey St., Elizabeth, 4, N.J. (Jan. '43) *M*

**Warde, John S.,** 7 Whitewood Ave., West Brighton, S.I. 10, N.Y. (May '30)

**Warder, Charles,** Supt. of Water Works, Niagara Falls, Ont., Can. (Jan. '16)

**Wardle, J. McClure,** *see* Hudson Dept. of Public Works

**Ware, Howard T.,** Engr., The Central Foundry Co., Box 502, Union, N.Y. (July '35)

**Waring, F. Holman,** Chief Engr., State Dept. of Health, Columbus 15, Ohio (Feb. '15)

**Waring, William H.,** Mgr., Transite Pipe Sec., Johns-Manville Sales Corp., 1000 Market St., St. Louis 1, Mo. (Jan. '42) ★

**Warner, G. B.,** *see* Purity Springs Water Co.

**Warner, J. M.,** 402 S. Humboldt St., Denver 9, Colo. (July '35)

**Warner, J. P.,** Mgr., Chem. Products Div., Standard Oil Co. of Louisiana, Baton Rouge, La. (Jan. '43) *M*

**Warren, Chester A.,** Assoc. Engr., Bureau of Water Supply, 1633 N. Caroline St., Baltimore, Md. (May '22)

**Warren Foundry & Pipe Corp.,** J. H. Morrison, Vice-Pres., 11 Broadway, New York 4, N.Y. (Assoc. M. Mar. '11)

**Warren, Herbert Clifton,** Secy.-Mgr., Glendora Irrigating Co., 224 N. Michigan Ave., Glendora, Calif. (Mar. '27)

**Warren, J. B.,** Director, Brockway Testing Labs., Box 43, DuBois, Pa. (Apr. '30) *P*

**Warren, W. D. P.,** Pres., Warren & Van Praag, Inc., 447–450 Standard Office Bldg., Decatur 12, Ill. (Jan. '38)

**Warrick, Louis F.,** State San. Engr., State Board of Health, Madison, Wis. (Apr. '20) *Fuller Award '40. P*

**Wartelle, C. L.,** City Engr., City Eng. Dept., County-City Bldg., Seattle 4, Wash. (Apr. '39)

**Washington Suburban Sanitary Com.,** 4017 Hamilton St., Hyattsville, Md. (Corp. M. May '30)

**Washington Water Power Co.,** A. J. Turner, Box 1445, Spokane 6, Wash. (Corp. M. Nov. '30)

**Water & Sewage,** K. J. Salmond, 341 Church St., Toronto 2, Ont., Can. (Assoc. M. May '16)

**Water Leak Detector Co.,** 112 N. 3rd St., Columbus 15, Ohio (Assoc. M. Apr. '37)

**Water Works & Sewerage,** 330 S. Wells St., Chicago 6, Ill. (Assoc. M. June '29)

**Water Works Engineering,** Editorial Dept., 24 W. 40th St., New York 17, N.Y. (Assoc. M. June '19)

**Water Works Supply Co.,** Carroll B. Abbott, 501 Howard St., San Francisco 5, Calif. (Assoc. M. Apr. '28)

**Waterford Public Utilities Com.,** D. A. Hill, Treas., Waterford, Ont., Can. (Corp. M. Apr. '44)

**Waterloo Water Works,** Warner J. Lang, Secy. & Gen. Mgr., Waterloo, Iowa (Corp. M. Apr. '41)

**Waterman, Earle Lytton,** Prof. of San. Eng., Univ. of Iowa, 208 Engineering Bldg., Iowa City, Iowa (Dec. '22) *Director '38–'41.*

**Waterous Co.,** Fred A. Waterous, St. Paul 1, Minn. (Assoc. M. Apr. '39)

**Waterous, Fred A.,** *see* Waterous Co.

**Waters, Robert J.,** Supt. of Filters, Bureau of Water, 6825 Oakley St., Philadelphia 11, Pa. (Jan. '41) *P*

**Watford, Troy Ellis,** Cons. Engr., Box 661, Gadsden, Ala. (Jan. '42)

**Watkins, J. S.,** Cons. Engr., 145 E. High St., Lexington 4, Ky. (Aug. '33) *P*

**Watkins, Samuel C.,** 1800 Esplanade Ave., Klamath Falls, Ore. (Apr. '29)

**Watkins, William W.,** 46 Elm St., Oneonta, N.Y. (June '22) ★

**Watson, David J.,** Supt. of Bldgs. & Grounds, Clemson Agricultural College, Clemson, S.C. (Jan. '39)

**Watson, G. Leland,** *see* Lake Forest Water Dept.

**Watson, H. G.,** City Engr., 801 E. 17th St., Cheyenne, Wyo. (Oct. '38) *M*

**Watson, Hazen E.,** Asst. Mech. Engr., Detroit Water Board, 9300 W. Jefferson Ave., Detroit 17, Mich. (Affil. July '40)

**Watson, Kenneth S.,** Chem. Engr., Div. of San. Eng., State Water Com., Charleston 5, W.Va. (Affil. Jan. '39) ★

**Watson, Robt. G.,** Supt., Power Plant & Water Works Dept., Edmonton, Alta., Can. (Apr. '39) *P*

**Watson, W. S.,** Supt., Board of Public Works, Water Dept., City Hall, Hannibal, Mo. (Jan. '40)

**Watts, M. R.,** 620 Pittsburgh St., Springdale, Pa. (July '44)

**Waverly Water Dept.,** Drawer 149, Waverly, N.Y. (Corp. M. July '43)

**Wayne County Board of County Road Comrs.,** John E. Hiltz, Engr. of Water System, 3800 Barlum Tower, Detroit 26, Mich. (Corp. M. Apr. '42)

**Weagraff, Chas. R.,** Water Supt., 41 Main St., Salamanca, N.Y. (July '35)

**Wear, Ario,** *see* Bethlehem, City of

**Weatherford, L. L.,** Supt., Atchison Water Co., Box 374, Atchison, Kan. (May '30) *M*

**Weaver, Allen J.,** Chemist, Southern Analytical Lab., Jacksonville 1, Fla. (July '35) *P*

**Weaver, E.,** Mgr., Petrolia Public Utilities Com., Petrolia, Ont., Can. (Affil. Jan. '40)

**Weaver, Herbert L.,** Cons. Engr., 542 E. 38th St., Baltimore, Md. (Oct. '42)

**Weaver, Stuart M.,** Supt., Water Bureau, Montclair, N.J. (Jan. '25) ★

**Weaver, W. H.,** Gen. Mgr., DeKalb County Water System, Decatur, Ga. (Jan. '38) *M*

**Webb, Clark D.,** Dist. Mgr., Pacific States Cast Iron Pipe Co., 437 S. Hill St., Los Angeles 13, Calif. (Oct. '43) *MP*

**Webb, J. D.,** *see* Birmingham Industrial Water Supply System

**Webb, S. W.,** Dist. Mgr., Consumers Power Co., Cadillac, Mich. (Jan. '21) *MP*

**Webb, W. B.,** c/o Mrs. May Helves, Madrid, Iowa (Jan. '41) ★

**Webber, Edwin G.,** Supt., Water Works, Lakeside, Ohio (July '44) *P*

**Weber, Robt. R.,** Dist. Sales Mgr., Mathieson Alkali Works, Inc., 334 Dixie Terminal Bldg., Cincinnati 2, Ohio (Apr. '43) *P*

**Weber, Walter H.,** City Mgr., City Hall, Forest Grove, Ore. (Jan. '44)

**Webster, Fred D.,** Water Meter Sales, Pittsburgh Equitable Meter Co., 582 Market St., San Francisco 4, Calif. (Oct. '37) *M*

**Webster, S.,** *see* Tillsonburg Public Utilities Com.

**Weckwerth, H. F.,** Supt., Kaukauna Water Works, Kaukauna, Wis. (June '30)

**Wedemeyer, C. C.,** Mgr., Water Dept., First National Bank Bldg., Latrobe, Pa. (Apr. '44) *M*

**Wedum, M. C.,** Chairman, Board of Public Works, 703 Broadway, Alexandria, Minn. (July '44)

**Weeber, W. Keith,** Dist. San. Engr., State Dept. of Health, City Hall, East Peoria, Ill. (Affil. Jan. '41) ★

**Weed, Frederick H.,** 25 W. Irving St., Chevy Chase 15, Md. (Nov. '25) *P*

**Weekes, Claude H.,** *see* Fresno City Water Dept.

**Weese, Robert A.,** Supt., Dept. of Water & Sewers, Oceanside, Calif. (Oct. '40) *M*

**Wehner, Carl T.,** *see* Allendale, Water Dept. of Boro of

**Weidlein, E. R.,** Mellon Institute of Industrial Research, 4400 Fifth Ave., Pittsburgh 13, Pa. (June '24)

**Weidner, Hayes,** Supt. of Water & Sewers, 516 N. Leroux St., Flagstaff, Ariz. (July '32)

**Weigand, George A.,** Chief Engr., Dept. of Water & Sewers, Civic Center Bldg., Miami 32, Fla. (Oct. '42)

**Weight, Walter O.,** Dist. Mgr., Hersey Mfg. Co., 450 E. 3rd St., Los Angeles 13, Calif. (Jan. '42) *MP*

**Weir, John J.,** Sales Mgr., The Lansdell Co., 95 Zabriskie St., Hackensack, N.J. (Affil. Jan. '39)

**Weir, Kenneth J.,** Supervisor of Fuel & Water Service, C. M. St. P. & P. RR. Co., 898 Union Station, Chicago 6, Ill. (Jan. '44)

**Weir, Paul,** Asst. Gen. Mgr. Atlanta Water Works, 1210 Hemphill Ave., N.W., Atlanta, Ga. (Dec. '29) *Fuller Award '40. Goodell Prize '41. Director '43–'46. M*

**Weir, Robert M.,** *see* MacLean Weir, Ltd.

**Weir, T. J.,** 3161/2 W. 52nd Pl., Los Angeles 37, Calif. (Jan. '41)

**Weir, W. Victor,** Supt., St. Louis County Water Co., 6600 Delmar Blvd., University City 5, Mo. (July '24) *Diven Medal '40. Fuller Award '43. AMP*

**Weir, W. H.,** 945 Rupley Drive, N.E., Atlanta, Ga. (Dec. '24) *Director '31–'37.* ★

**Weisemann, Thomas W.,** Supt., Home Water Co., Chesterton, Ind. (Jan. '41)

**Weiss, Rudolph H.,** Engr., State Health Dept., 1512 South St., Kerrville, Tex. (Jan. '43) *M*

**Welch, Donald L.,** 6207 S. Greenwood Ave., Chicago 37, Ill. (Apr. '43) *P*

**Welch, John P.,** Pump Repairman, Bureau of Water Works & Supply, 4120 Degnan Blvd., Los Angeles, Calif. (Jan. '41)

**Welch, W. A.,** Industrial Chemical Sales Div., 748 Public Ledger Bldg., Philadelphia 6, Pa. (Jan. '36) *P*

**Weldon Water Works,** U. Bixby Pierce, Supt., Weldon, N.C. (Corp. M. Jan. '43)

**Weldon, Wm. B.,** Asst. Engr., 404 City Hall, Chicago 2, Ill. (July '38) *M*

**Well Machinery & Supply Co.,** Gordon B. Smith, 1629 Main St., Fort Worth, Tex. (Assoc. M. July '39)

**Welland Board of Water Comrs.,** J. C. Street, Supt., Welland, Ont., Can. (Corp. M. May '20)

**Wells, Bert H.,** *see* Coca-Cola Co.

**Wells, C. P.,** Munic. Engr., 421—6th Ave., N., Great Falls, Mont. (Apr. '43) *P*

**Wells, Chas. E.,** *see* Albuquerque, City of

**Wells, Monroe,** 100 C Lincoln Ave., Forest Glen, Pineville, La. (Apr. '43) ★

**Wells, Sidney W.,** Chemist, State Board of Health, Jacksonville, Fla. (Apr. '37) ★

**Wells, W. Plummer,** Chemist, Aberdeen Water Dept., 1402 N. Lincoln St., Aberdeen, S.D. (July '39) *P* ★

**Welmon, William C.,** Secy. & Chief Acctg. Officer, Southern California Water Co., 1206 S. Maple Ave., Los Angeles 15, Calif. (Oct. '43) *A*

**Welsford, H. R.,** San. Engr., State Dept. of Health, 413 First National Bank Bldg., Greensburg, Pa. (Apr. '27) ★

**Welsh, M. G.,** Supt. of Distr., Newport News Water Works Com., Denbigh, Va. (Oct. '43) *M*

**Welsh, R.,** *see* Brantford Public Utilities Com.

**Wendell, Raymond T.,** Div. Engr., Water Utilities Service Corp., Water St., Skowhegan, Me. (Apr. '44) *MP*

**Wendt, Edward,** Foreman, City Water Dept., Whittier, Calif. (Oct. '41)

**Wenger, F. E.,** Office Engr., Russell & Axon, 4903 Delmar Blvd., St. Louis 8, Mo. (Jan. '41) *P*

**Wenger, Harry V.,** c/o Earl Carter, 910 Electric Bldg., Indianapolis 4, Ind. (Apr. '43)

**Wenger, J. Harold,** Supt.-Chemist, Water & Sewage Dept., 83 E. Broadway, Westerville, Ohio (July '44) *P*

**Wentworth, John P.,** 569 Fellsway East, Malden 48, Mass. (July '26)

**Wenzel, William J.,** Assoc. Engr., Corwin & Co., Inc., 413 Medical Arts Bldg., Great Falls, Mont. (Apr. '44) *P*

**Werth, C. W.,** Asst. Supt. of Filtration, Board of Water Comrs., 3363 W. Clyde Pl., Denver 11, Colo. (Jan. '36) *P*

**Wertz, C. F.,** Resident Engr., Dept. of Water & Sewers, Box 4821, Miami, Fla. (Mar. '24) *MP*

**West, Francis D.,** Dist. Sales Mgr., The Permutit Co., 111 Rugby Rd., Syracuse 6, N.Y. (June '30) *P*

**West, George M.,** *see* Sayre Water Co.

**West Lafayette Water Works Co.,** West Lafayette, Ind. (Corp. M. Apr. '34)

**West Palm Beach Water Co.,** R. W. Reynolds, Box 1311, West Palm Beach, Fla. (Corp. M. Apr. '30) *Fuller Award '41. Director '40–'42.*

**West Reading, Borough of,** Howard F. Rickenback, Mgr., Bur. of Water, 500 Chestnut St., West Reading, Pa. (Corp. M. Jan. '44)

**West Texas Utilities Co.,** W. E. Cuzick, Water Plant Operator, San Angelo, Tex. (Corp. M. Jan. '43)

**West, Vernon F.,** Consumers Water Co., Box 151 Pearl Street Station, Portland 6, Me. (June '14)

**West Virginia Public Service Com.,** Earle H. Morris, Chief Engr., State House, Charleston 5, W.Va. (Corp. M. Apr. '39)

**West Virginia Pulp & Paper Co.,** *see* Industrial Chemical Sales Div.

**Westbrook, James A.,** San. Engr., State Board of Health, Raleigh, N.C. (Oct. '43) *P*

**Westbury Water Dist.,** Leroy Ebright, Supt., 160 Drexel Ave., Westbury, N.Y. (Corp. M. Jan. '43)

**Westchester Co. Dept. of Health,** Richard M. McLaughlin, Director, Div. of Sanitation, County Office Bldg., White Plains, N.Y. (Corp. M. Dec. '30)

**Western City,** Winston R. Updegraff, 458 S. Spring St., Los Angeles 13, Calif. (Assoc. M. Sept. '29)

**Western Felt Works,** *see* Acadia Synthetic Products Div.

**Western Pipe & Steel Co. of California,** R. D. Plageman, Vice-Pres., 200 Bush St., San Francisco, Calif. (Assoc. M. Aug. '24)

**Westfahl, Everett,** Supt., City Water Works, Neenah, Wis. (Jan. '44) *P*

**Westmoreland, Wesley, Jr.,** Southwestern Sales Mgr., McWane Cast Iron Pipe Co., 1501 Mercantile Bank Bldg., Dallas, Tex. (Jan. '43)

**Weston, Arthur D.,** Chief Engr., Massachusetts Dept. of Public Health, 511A State House, Boston 33, Mass. (July '31) *P*

**Weston, Roy F.,** San Engr., The Atlantic Refining Co., Philadelphia 1, Pa. (July '37) *P*

**Weyher, Jno. E.,** Supt. of Public Utilities, Kinston, N.C. (Jan. '43)

**Whalen, Joseph F.,** *see* Joliet, City of

**Whaley, W. J.,** Supt., Water Works, Box 52, Winder, Ga. (Apr. '44) *P*

**Wharton Board of Public Works,** Leo A. Mulligan Sr., Supt., Water Dept., 18 W. Central Ave., Wharton, N.J. (Corp. M. July '43)

**Wheeden, H. Ford,** Office Engr., Baltimore County Metropolitan Dist., 1525 E. 29th St., Baltimore, Md. (July '42)

**Wheeler, Robert C.,** Barker & Wheeler, 36 State St., Albany 7, N.Y. (Oct. '14)

**Whelchel, H. E.,** Supt., Water Works, College Park, Ga. (Nov. '30)

**Whipple, Melville C.,** Assoc. Prof. of San. Chem., Harvard Univ., 222 Pierce Hall, Cambridge 38, Mass. (May '22) *P*

**Whitaker, M. B.,** *see* Knoxville Elec. Power & Water Board

**Whitby Public Utility Com.,** H. L. Pringle, Supt., Munic. Water Works Dept., Whitby, Ont., Can. (Corp. M. Feb. '24)

**Whitcomb, Leon R.,** San. Engr., 408 West Ave., Jenkintown, Pa. (Apr. '37)

**White, Charles W.,** Asst. San. Engr., State Dept. of Public Health, 519 Dexter Ave., Montgomery 4, Ala. (Jan. '41) *P*

**White, Clyde,** Water Supt., Box 195, Kermit, Tex. (Jan. '44) *M*

**White, Ensley M.,** Supt., Public Works, 15 St. Nicholas Pl., Red Bank, N.J. (July '37)

**White, Everett G.,** Pearl St., Knox, Ind. (Apr. '42) *MP*

**White, Fred H.,** Supt., Fall Brook Utility Dist., Fall Brook, Calif. (Oct. '41)

**White, George C.,** Div. Engr., Wallace & Tiernan Sales Co., 171 Second St., San Francisco, Calif. (Jan. '43) *P*

**White, George W.,** The Harwood Beebe Co., 208 Montgomery Bldg., Spartanburg, S.C. (Dec. '24) *P*

**White, Guy H.,** Supt. of Water Plant, 2217 Gadsden St., Columbia 2, S.C. (Nov. '25) *Fuller Award '38. Director '40–'43. P*

**White, Herbert L.,** 507 W. Delaware Ave., Urbana, Ill. (Jan. '32) *M*

**White, Homer C.,** Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '37) *A*

**White, Horace,** Supt. of Water Works, Williamsburg, Ohio (Oct. '40)

**White, James R.,** *see* Preload Co.

**White, Lawrence S.,** Bacteriologist & Asst. Chemist, Victoria Park Filtration Plant, Queen St., E., Toronto, Ont., Can. (Jan. '43) *MP*

**White, Leonard P.,** San. Engr., Water Div., Utilities Dept., Basement City Hall, Houston 2, Tex. (July '43) *P*

**White Plains Dept. of Public Works,** William I. Collyer, Deputy Comr. of Public Works, White Plains, N.Y. (Corp. M. July '16)

**White, William J.,** *see* American Valve Mfg. Co.

**White, Wm. Wallace,** Director, Div. of Public Health Eng., State Dept. of Health, 1 Fordonia Bldg., Reno, Nev. (July '37) ★

**Whitley, F. H.,** Instructor in San. Eng., New York Univ., University Heights 53, N.Y. (Jan. '39) ★

**Whitlock, C. B.,** Mgr., West Virginia Water Service Co., Madison, W.Va. (July '35) ★

**Whitlock, Ernest W.,** Engr. with Malcolm Pirnie, 25 W. 43rd St., New York 18, N.Y. (May '30) *AP*

**Whitman, Earl Roger,** Civ. Eng. Assoc., Bureau of Water Works & Supply, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '35)

**Whitman, G. E.,** *see* Goldsboro, City of

**Whitman, Ezra B.,** Whitman, Requardt & Assoc., Engrs., 1304 St. Paul St., Baltimore 2, Md. (Apr. '10)

**Whitmore, I. V.,** Supt., Water Works Dept., Park Ave., Ladysmith, Wis. (Jan. '44) *M*

**Whitney, Township of,** W. F. Strutt, Clerk, Porcupine, Ont., Can. (Corp. M. Apr. '44)

**Whittaker, A. R.,** *see* National Meter Div.

**Whittaker, H. A.,** Director, Div. of Sanitation, State Dept. of Health, Minneapolis 14, Minn. (June '13)

**Whittier, City of,** M. R. Bowen, City Water Supt., City Hall, Whittier, Calif. (Corp. M. Dec. '26)

**Whysall, Chas. C.,** Chemist, Water Co., Marion, Ohio (July '44)

**Wichita, City of,** Milford E. Rogers, Production Supt., Munic. Water Supply Plant, City Hall, Wichita, Kan. (Corp. M. Jan. '40)

**Wicker, E. P.,** Supt. of Filtration, R.F.D. No. 2, Sanford, N.C. (Sept. '30)

**Wickham, R. B.,** Supt., Service Div., West Point Mfg. Co., Langdale, Ala. (July '38) *M*

**Wickwire, J. William,** *see* Edson Corp.

**Widsteen, P. W.,** Supt., Menasha Elec. & Water Utilities, 809 Broad St., Menasha, Wis. (July '43)

**Wiedeman, H. F.,** Wiedeman & Singleton, Box 1878, Atlanta, Ga. (Mar. '25) *Director '31–'34. P*

**Wieghardt, George F.,** Hydr. Engr., 1337 Dickerson Rd., West Englewood, N.J. (Mar. '24)

**Wiegman, Ernest,** Supt., Water Dept., Board of Public Affairs, Pemberville, Ohio (Apr. '44)

**Wiel, Kurt,** City Engr., Miles City, Mont. (Feb. '34) *M*

**Wieters, A. H.,** Director, Div. of Public Health Eng., State Dept. of Health, Des Moines 19, Iowa (Nov. '21) *P*

**Wiggin, Thos. H.,** Cons. Engr., 90 Broad St., New York 4, N.Y. (May '22) *Goodell Prize '40. Honorary M. '44.*

**Wightman, F. C.,** 33 Queen St., Amherst, N.S., Can. (July '38)

**Wilberding, M. X.,** Vice-Pres. & Engr.-in-Charge, Mountain State Water Co. of West Virginia, 1822 Eye St., N.W., Washington 6, D.C. (June '30) *M*

**Wilbur, C. C.,** 9200 Bradford Rd., Silver Spring, Md. (Feb. '24)

**Wilcox, William F.,** Mech. Engr., Box 698, Atlanta 1, Ga. (Sept. '93) *M*

**Wilder, G. H.,** Operator, Water Works, 514 S. Broadway, Medina, Ohio (Apr. '43) *P*

**Wilensky, Oscar R.,** Counsel, North Jersey Dist. Water Supply Com., Wanaque, N.J. (Apr. '44)

**Wiley, John Safford,** Passed Asst. San. Engr., U.S. Public Health Service, Typhus Control Unit, 41 Exchange Pl., Atlanta 3, Ga. (July '43)

**Wiley, Ralph B.,** Head, School of Eng. & Eng. Mechanics, Purdue Univ., La Fayette, Ind. (Apr. '34) *P*

**Wiley, Richard E.,** *see* Hillsboro Utilities Com.

**Wilke, Harvey R.,** Capt., Supervisor, Water Purif. Course, The Engineer School, Fort Belvoir, Va. (Jan. '43) *P* ★

**Wilkes, E. Dean,** Mgr., Control & Metering, 454 King St., W., Toronto, Ont., Can. (July '41)

**Wilkes, J. Fred,** Chem. Engr., Dearborn Chemical Co., 55 Lafayette Drive, N.E., Atlanta, Ga. (Oct. '37) ★

**Wilkins, George F.,** Eng. Service Div., General Chemical Co., 235 Montgomery St., San Francisco 4, Calif. (Jan. '40)

**Willard, Ernest C.,** Cons. Engr., Public Service Bldg., Portland 4, Ore. (Oct. '14) *A*

**Willey, Frank E.,** *see* Lawrence City Water Dept.

**Williams, Charles H.,** City Engr. & Water Supt., 826 Percival St., Olympia, Wash. (July '34) *MP*

**Williams, Charles P.,** 1269 Law St., San Diego 9, Calif. (Nov. '32)

**Williams, Chesley L.,** *see* Firestone Tire & Rubber Co.

**Williams, Clyde E.,** Engr., 312 W. Colfax Ave., South Bend 7, Ind. (July '37) *P*

**Williams, D. McGregor,** *see* Durham Water Dept.

**Williams, Frank J.,** Field Supt., Dept. of Water & Power, 14601 Aetna St., Van Nuys, Calif. (Oct. '43)

**Williams, Fred F.,** Supt., Elec. Dept., 810 S. Highland, Chanute, Kan. (Jan. '40)

**Williams, George,** Supt.-Treas., Honesdale Consolidated Water Co., Box 307, Honesdale, Pa. (July '36)

**Williams, H. J.,** Gen. Supt., Carthage Water & Elec. Plant, 149 E. Third St., Carthage, Mo. (Jan. '44) *M*

**Williams, H. L.,** Pentwater, Mich. (Aug. '94)

**Williams, L. O., Jr.,** State San. Engr., State Dept. of Public Health, Cheyenne, Wyo. (Jan. '36) *Fuller Award '43.* ★

**Williams, Leon G.,** 1309 Westover Ave., Norfolk 7, Va. (July '38) *P*

**Williams, R. O.,** Plant Supt., Lake Clinton, Foss, Okla. (Oct. '39)

**Williams, Stanley N.,** Civ. Engr., 117 Grace St., Roselle, N.J. (July '36) *P*

**Williams, Whitfield,** Supt. of Filtration, Fredericksburg Water Dept., R.F.D. No. 2, Fredericksburg, Va. (Jan. '43)

**Williams, William D.,** Morris Knowles, Inc., 1312 Park Bldg., Pittsburgh, Pa. (Apr. '43)

**Williamson, A. E.,** Assoc. San. Engr., State Board of Health, Jacksonville, Fla. (Oct. '41) ★

**Williamson, Cliff T.,** *see* Macon Board of Water Comrs.

**Williamson, Edward,** Supt., Downey County Water Dist., Downey, Calif. (Oct. '39)

**Williamson, James E.,** Dist. Mgr., Rensselaer Valve Co., 62 Patterson Ave., Hempstead, N.Y. (July '43)

**Williamson, Joe, Jr.,** Vice-Pres., Russell & Axon, Cons. Engrs., 415 S. Palmetto Ave., Daytona Beach, Fla. (July '40) *P*

**Williamson, L. A.,** Div. Mgr., California Water & Telephone Co., Box I, National City, Calif. (July '38) *M*

**Williamson, R. C.,** Acting Mgr., Aluminate Chemicals, Ltd., 555 Eastern Ave., Toronto 8, Ont., Can. (July '37) *P*

**Williamson, Robert W.,** Mgr. & Treas., Columbia Water System, 212 W. 7th St., Columbia, Tenn. (Oct. '41)

**Williamson, W. T.,** City Hall, Bloomfield, Conn. (Jan. '43)

**Willis, Frank T.,** C.C.M.O. Co., Water Plant, Box 68, McKittrick, Calif. (Sept. '29) *MP*

**Willis, Willet R.,** Chemist & Bacteriologist, 1343 N. Nevada Ave., Colorado Springs, Colo. (July '38) *P*

**Williston Park, Inc. Village of,** R Kent, Clerk, 494 Willis Ave., Williston Park, N.Y. (Corp. M. Oct. '43)

**Wills, W. Compton,** Mgr. & Chief Engr., Water Dept., 16th & Market Sts., Wilmington 99, Del. (July '26)

**Wilmot, W. G.,** San. Engr., U.S. Corps of Engrs., Camp Adair, Ore. (Apr. '44) *MP*

**Wilsey, E. P.,** *see* Hillsborough Water Dept.

**Wilson, A.,** Mgr., Pumps & Softeners, Ltd., London, Ont., Can. (July '41) *P*

**Wilson, Albert E., Jr.,** Asst. San. Engr., Corps of Engrs., Third Service Command, 1037 Calvert Bldg., Baltimore 2, Md. (Jan. '41) *P*

**Wilson, C. F.,** *see* Corning Water Dept.

**Wilson, Carl,** 405 S. Hill St., Los Angeles 13, Calif. (June '28) *P*

**Wilson, E. J. F.,** Wiley & Wilson, Cons. Engrs., 908 Peoples National Bank Bldg., Lynchburg, Va. (Apr. '36)

**Wilson, Guy L.,** Local Supt., Washington Water Power Co., Lewiston, Idaho (July '34) *P*

**Wilson, I. E.,** Water Comr., City Hall, Faribault, Minn. (Sept. '22)

**Wilson, J. B.,** San. Engr., 5300 Boulevard Pl., Indianapolis, Ind. (Jan. '39) *P*

**Wilson, Jack H.,** Asst. Engr., Little Rock Munic. Water Works, Little Rock, Ark. (Jan. '42) ★

**Wilson, Murray A.,** Cons. Engr., Wilson & Co., Box 518, Salina, Kan. (July '39)

**Wilson, Norman E.,** Mgr., Amherstburg Public Utilities Com., Amherstburg, Ont., Can. (July '41) *AM*

**Wilson, O. B.,** Supt. & Mgr., Water Works, Green Forest, Ark. (Oct. '43)

**Wilson, Owen,** Asst. Engr., Metropolitan Water Dist., 306 W. 3rd St., Los Angeles 13, Calif. (Oct. '43) *MP*

**Wilson, Percy S.,** 325 Washington St., Glen Ridge, N.J. (July '26) *AMP*

**Wilson, R. C.,** *see* Kaiser Co., Inc.

**Wilson, Ralph D.,** Cons. Engr., Wilson & Anderson, 104 W. Clark St., Champaign, Ill. (Apr. '44) *P*

**Wilson, Walter,** San. Engr., c/o Post Engrs., Camp Livingston, La. (Oct. '42) *P*

**Wilson Water Works,** L. E. Johnson, Supt., Wilson, N.C. (Corp. M. Jan. '43)

**Wilson, Wilmer,** Supt., Marion City Water Works, Marion, Ind. (Jan. '44)

**Wimer, C. F.,** Supt., Water Dept., Hastings, Minn. (Apr. '42)

**Winchester, D. S.,** 10 Rose Ave., Sebring, Fla. (Jan. '43) *MP*

**Windell, Talmage,** Water Supt., Corydon Water Co., Corydon, Ind. (Apr. '43)

**Winder, J. B.,** Chief Engr., Dallas City Water Works, 107 City Hall, Dallas 1, Tex. (Oct. '35) *Director '36–'39. M*

**Winder, N. G.,** 5210 Bradford St., Dallas 9, Tex. (Oct. '39) ★

**Windfelder, Walter,** Chief, Div. of Water Assessments & Collection, Water Works, City Hall, Milwaukee 2, Wis. (Jan. '42) *A*

**Windsor Utilities Com.,** Gordon B. Ellis, Chairman, 342 Rankin Blvd., Windsor, Ont., Can. (Corp. M. Apr. '31)

**Wineke, H. A.,** *see* National Lead Co.

**Winfree, W. W.,** *see* Glamorgan Pipe & Foundry Co.

**Winger, Robert L.,** Supt., Maywood Mutual Water Co. No. 2, 4427 E. Slauson Ave., Maywood, Calif. (Oct. '42)

**Winona Board of Munic. Works,** H. C. Ahrens, Secy., Winona, Minn. (Corp. M. Dec. '22)

**Winsinger, O. F.,** Station B, Box 130, Toledo, Ohio (Apr. '42)

**Winslow, Edward L., Jr.,** 3802 Calloway Ave., Forest Park, Baltimore, Md. (Apr. '30)

**Winslow, F. L.,** Secy. & Treas., Plainfield-Union Water Co., Plainfield, N.J. (July '35) *A*

**Wintermute, Roy L.,** *see* LaGrange Park, Village of

**Wintgens, P. J.,** Supt., Ford City Water Dept., Ford City, Pa. (July '35)

**Wintz, Edward R.,** Supt., Conduit Construction Co., 3600—13th Ave., Oakland 10, Calif. (Oct. '40)

**Wirth, Harvey E.,** Asst. San. Engr., Bureau of San. Eng., State Board of Health, State Office Bldg., Madison, Wis. (Jan. '41) ★

**Wirtz, George L.,** Pres., Atlas Mineral Products Co. of Pa., Mertztown, Pa. (Oct. '38)

**Wirz, Herman, Jr.,** Field Supt., Dept. of Water & Power, 1639 W. 219th St., Torrance, Calif. (Oct. '43) *M*

**Wise, William R.,** 2003 Johnstone St., Newberry, S.C. (Apr. '38) ★

**Witty, T. E.,** Supt. of Plants, Thomasville, N.C. (July '40)

**Wolcott, Herbert,** Water Engr., Wolcottwood, R.F.D. 6, Columbia, Mo. (Jan.-'39) *P*

**Wolfe, Edward E.,** 713 Washington St., Kansas City 6, Mo. (Apr. '22) *P*

**Wolfe, Lillian E., (Miss),** Treas. & Asst. Secy., The Pennsylvania Water Works Assn., 510 Telegraph Bldg., Harrisburg, Pa. (Apr. '42)

**Wolfe, Thomas F.,** Research Engr., Cast Iron Pipe Research Assn., 1015 Peoples Gas Bldg., Chicago 3, Ill. (Mar. '22) *MP*

**Wolff, William R.,** Assoc. Hydr. Engr., Public Service Com., 233 Broadway, New York 7, N.Y. (Mar. '30) *A*

**Wolman, Abel,** Prof. of San. Eng., Johns Hopkins Univ., Baltimore 18, Md. (Mar. '18) *Editor '22–'37. Diven Medal '37. Director '39–'42, '43–'44. Vice-Pres. '42. President '43. P*

**Woltman, J. J.,** Civ. Engr., 314 Unity Bldg., Bloomington, Ill. (May '23) *MP*

**Wood, A. Baldwin,** Gen. Supt., Sewerage & Water Board, 526 Carondelet St., New Orleans 12, La. (Jan. '39)

**Wood, Alan A.,** Partner, Luther & Wood, 1427 Eye St., N.W., Washington 5, D.C. (Jan. '44) *P*

**Wood, Frank B.,** 1610 Chambers St., Vicksburg, Miss. (Oct. '42) ★

**Wood, Geo. L.,** Supt., Water Dept., Bishop, Calif. (Oct. '41) *AMP*

**Wood, J. E.,** Supt., Com. of Public Works, 14 Farr Ave., Union, S.C. (Apr. '44) *P*

**Wood, J. G.,** Mgr., Texarkana Water Corp., Texarkana, Ark. (July '43)

**Wood, James,** Eng. Inspector of Water Works, 218 Walnut St., Peekskill, N.Y. (Apr. '37) *P*

**Wood, Leonard P.,** 118 Ralph Ave., White Plains, N.Y. (Mar. '24) *Diven Medal '34.*

**Wood, R. D., Co.,** Charles H. Becker, 400 Chestnut St., Philadelphia 5, Pa. (Assoc. M. Apr. '84)

**Wood, Theodore V.,** R. D. Wood Co., 400 Chestnut St., Philadelphia 5, Pa. (Apr. '30) *M*

**Wood, Thomas,** Clerk, Borough of Pompton Lakes Water Dept., 9 Center St., Pompton Lakes, N.J. (Apr. '43) *A*

**Woodall, Lewis F.,** Territorial Repr., Johns-Manville Corp., Box 988, Miami 6, Fla. (Oct. '43)

**Woodburn, James G.,** Prof. of Hydr. Eng., Univ. of Wisconsin, 211 N. Prospect Ave., Madison 5, Wis. (Oct. '41)

**Woodbury, William Rodes,** City Mgr., 400 N. Boundry St., Williamsburg, Va. (Oct. '43) *M*

**Woodhouse, H. M.,** City Engr., City Hall, Donald St., Fort William, Ont., Can. (Jan. '44)

**Woods, C. W.,** *see* Refinite Corp.

**Woodson, John T.,** Southeastern Sales Mgr., National Cast Iron Pipe Co., Box 2542, Birmingham 2, Ala. (Jan. '39)

**Woolidge, Harold V.,** Production Mgr., Wallace & Tiernan, Ltd., 109 Evelyn Ave., Toronto, Ont., Can. (Jan. '42)

**Woonsocket Water Dept.,** City Hall, Woonsocket, R.I. (Corp. M. Apr. '44)

**Wooten, Frank, Jr.,** Wooten & Wooten, Cons. Engrs., 104 Latta Arcade, Charlotte 2, N.C. (Jan. '40)

**Wormser, F. E.,** *see* Lead Industries Assn.

**Worthen, Jesse M.,** Route 1, Box 273, Tacoma, Wash. (Oct. '43) *MP*

**Worthington Pump & Machinery Corp.,** Thomas Cruthers, Vice-Pres., Harrison, N.J. (Assoc. M. June '01)

**Worthington-Gamon Meter Co.,** 296 South St., Newark 5, N.J. (Assoc. M. May '20)

**Wrench, Joseph,** Sales Mgr., Industrial Chemical Sales Div., 230 Park Ave., New York 17, N.Y. (Jan. '37) *P*

**Wright, C. W.,** Pres., Badger Meter Mfg. Co., 2357-71 N. 30th St., Milwaukee 10, Wis. (Mar. '27)

**Wright, Clarence W.,** Assoc. Civ. Engr., Dept. of Water Supply, 735 Randolph St., Detroit 26, Mich. (Affil. July '39) *M*

**Wright, H. R.,** Supt., Distr. Div., Dept. of Water & Sewers, 3020 Seminole St., Miami 33, Fla. (Oct. '42)

**Wright, Le Roy H.,** Supt. of Water Works, City Hall, Newark, N.Y. (Apr. '27) *P*

**Wright, Robert D.,** Acting Supt., City Water Dept., Lynchburg, Va. (Oct. '42) *M*

**Wyant, Carl,** 141 San Ysidro Rd., Santa Barbara, Calif. (Mar. '24)

**Wyatt, Wendell C.,** San. Engr., 932nd Sheridan Ave., Salina, Kan. (Oct. '43)

**Wyckoff, Charles R.,** 790 Riverside Drive, New York 32, N.Y. (Apr. '18) *P*

**Wyckoff, H. A.,** Prof. of Bacteriology & Public Health Eng., Georgia School of Technology, Atlanta, Ga. (Apr. '38) *P*

**Wyckoff, Wayne W.,** Asst. Civ. Engr., Dept. of Water & Power, Box 3669 Terminal Annex, Los Angeles 54, Calif. (Oct. '34)

**Wylam, Clarence C.,** Supervisor of Water Treatment Plants, Wright Aeronautical Corp., Lockland, Cincinnati 15, Ohio (Apr. '44) *MP*

**Wylds, H. Grady,** Supt. of Filtration, Augusta Water Works, 1405 Glenn Ave., Augusta, Ga. (Affil. Jan. '40) *P*

**Wymore, Allan H.,** San. Engr., War Dept., Camp Crowder, 2908 Joplin St., Joplin, Mo. (July '44)

**Yates, Herman A., Jr.,** Jr. San. Engr., Dept. of Public Works, Div. of Water Purif., 6843 Oglesby Ave., Chicago 49, Ill. (July '41) *P*

**Yates, W. G.,** Accountant, Water Dept., Wheeling, W.Va. (Oct. '43) *M*

**Yaxley, R. Gordon,** Supt. to Water Comrs., Waterford, N.Y. (Oct. '25) *Fuller Award '41. MP*

**Yegen, William,** Supt. of Filtration Plant, 422—9th St., Bismarck, N.D. (June '27) *P*

**York, Township of,** O. M. Falls, Comr. of Works, 40 Jarvis St., Toronto, Ont., Can. (Corp. M. July '32)

**Yost, Harold W.,** Cons. Engr., Yost & Gardner, Engrs., 401 Heard Bldg., Phoenix, Ariz. (July '42)

**Young, C. H.,** Dist. Engr., Pennsylvania Dept. of Health, Trust Bldg., Meadville, Pa. (June '29) *Director '44–'47.*

**Young, C. O.,** Supt., Water Treatment Plant, Cramerton Mills, Inc., Cramerton, N.C. (Oct. '41)

**Young, Francis D.,** Asst. Mgr., Pipe Sec., Cleveland Dist., Johns-Manville Sales Corp., 1530 Guildhall Bldg., Cleveland, Ohio (July '42) ★

**Young, George Richmond,** Village Mgr., Village Hall, Glencoe, Ill. (July '28)

**Young, J. L.,** Supt., Light & Water Works, Benton Munic. Water Works, 619 Market St., Benton, Ark. (Oct. '42)

**Young, Joseph E.,** 608 Wataga Drive, Louisville 6, Ky. (Affil. Jan. '43)

**Young, Oliver H.,** Supt., Kent City Water Works, 543 Fairchild Ave., Kent, Ohio (Jan. '39) *M*

**Young, R. W.,** Chief Engr., 3615 Broadway, Council Bluffs, Iowa (July '42) *M*

**Young, S. R.,** Supt., City Water Dept., Hardin, Mont. (Jan. '40)

**Young, T. L.,** Mgr., South Side Water Works Co., Chester, W.Va. (June '21) *Fuller Award '42. Director '43–'46.*

**Young, W. H.,** Supt. of Water Works, Ormond, Fla. (July '40)

**Youngstown Sheet & Tube Co.,** Pipe Sales Div., Stambaugh Bldg., Youngstown 1, Ohio (Assoc. M. Jan. '37)

**Yow, W. E.,** City Mgr., Asheboro, N.C. (Dec. '33) *A*

**Ypsilanti Water Dept.,** Carl C. Greim, Mgr. of Utilities, 111 Pearl St., Ypsilanti, Mich. (Corp. M. Apr. '44)

**Zack, Samuel I.,** San. Engr., Stone & Webster Eng. Corp., 71 Cloverdale Rd., Newton Highlands 61, Mass. (Jan. '44) *P*

**Zadigan, Ruben,** 1st Lt., APO 680, c/o Postmaster, New York, N.Y. (Oct. '42) ★

**Zapf, Chas. F.,** *see* Ventura City Water System

**Zapffe, Carl,** Box 93, Brainerd, Minn. (July '35) *P*

**Zele, Alexander S.,** Chemist, Long Island State Park Com., Belmont Lake State Park, Babylon, N.Y. (Oct. '40) *P*

**Zelley, John W.,** Asst. San. Engr., State Dept. of Health, Columbus Rd., Burlington, N.J. (Affil. Jan. '39) *P*

**Zerman, Samuel W.,** Hackensack Water Co., 4100 Park Ave., Weehawken, N.J. (Apr. '44) *M*

**Ziss, Harold A.,** *see* Evansville Water Works Dept.

**Zoeller, Anton John,** Supt., Meter Dept., Hackensack Water Co., 4100 Park Ave., Weehawken, N.J. (Jan. '44) *M*

**Zorn, Ray H.,** Salesman, Power Equipment Co., Oak Harbor, Ohio (Jan. '41) *P*

**Zufelt, Jerome C.,** Supt., City Water Dept., 418 St. Clair Ave., Sheboygan, Wis. (Oct. '31) *M*

# CORPORATE MEMBERS

*See Consolidated List of Members for addresses and other data*

Abercrombie, J. S., Co.
Adirondack W.W. (Lowville, N.Y.)
Alameda County W. Dist. (Centerville, Calif.)
Albert Lea, Minn., W. Dept.
Albion, N.Y., W. Dept.
Albuquerque, N.M., City of
Alexandria, La., W. Dept.
Allendale, N.J., Boro W. Dept.
Allentown, Pa., Bur. of W.
Allouez W. Dept. (Green Bay, Wis.)
Alpha, N.J., Borough of
Aluminum Co. of Canada, Ltd.
Ambridge, Pa., W. Dept.
American Enka Corp.
American W.W. & Elec. Co., Inc.
Ames, Iowa, W. Dept.
Anaconda Copper Mining Co.
Anderson, Ind., City of
Anheuser-Busch, Inc.
Ann Arbor, Mich., W. Dept.
Argentina, Obras Sanitarias de la Nacion
Asheville, N.C., City of
Ashland, Ore., W. Dept.
Astoria, Ore., City of
Auburn, N.Y., W. Dept.
Aurora, Minn., W. & Lt. Com.
Austin, Minn., Bd. of W., Elec., Gas & Power Comrs.

Bahia, Servicos de Aguas e Esgotos
Baker, Ore., Dept. of W., Fire & San.
Baldwin Park County (Calif.) W. Dist.
Ballston Spa, N.Y., W. Dept.
Barrie, Ont., Pub. Utils. Com.
Batavia, N.Y., City of
Bayonne, N.J., W. Dept.
Beaumont (Calif.) Irrigation Dist.
Beaver Dam, Wis., Munic. W. Dept.
Belleville, Ont., Pub. Utils. Com.
Bellingham, Wash., W. Dept.
Berlin, Pa., W. Co.
Bethlehem, Pa., City of
Beverly Hills, Calif., W. Dept.
Binghamton, N.Y., Bur. of W.
Birdsboro, Pa., W. Co.
Birmingham, Ala., Ind. W. Supply System
Birmingham W. Co. (Derby, Conn.)
Bloomfield, N.J., Town of
Bonham, Tex., W. Dept.
Boone, Iowa, W. Dept.
Boulder, Colo., W. Dept.
Bozeman, Mont., City of
Brampton, Ont., W. Com.
Brantford, Ont., Pub. Utils. Com.
Brazil, Ind., W.W.
Bristol, Tenn., City of
Bristol, Va., City of
Brookfield-North Riverside (Ill.) W. Com.
Brunswick & Topsham (Me.) W. Dist.
Buffalo, N.Y., Div. of W.
Buffalo Niagara Elec. Corp.
Burbank, Calif., Pub. Serv. Dept.
Burley, Idaho, City of

California Oregon Power Co.
Camden, N.J., Pub. Works Dept.
Canastota, N.Y., W. Dept.
Cannon Mills Co.
Canon City, Colo., W. Dept.
Canton, Miss., Munic. Utils.
Carbide & Carbon Chemicals Corp.
Carolina Aluminum Co.
Carolina Beach, N.C., Town of
Cedar Rapids, Iowa, City W.W.
Celanese Corp. of America
Central Power & Lt. Co. (Corpus Christi, Tex.)
Centralia, Ill., City W. Dept.
Charleston, S.C., Comrs. of Pub. Works
Charlottesville, Va., City of
Chateaugay, N.Y., W.W. Co.
Chatham, Ont., Bd. of W.
Chihuahua, Junta Central de Aguas del Estado
Chillicothe, Mo., Munic. Utils.
Citizens Utils. Co. (Wallace, Idaho)
Clewiston, Fla., City of
Clinton, Ont., Pub. Utils.
Coca-Cola Co., The
Community W. Serv. Co. (New York, N.Y.)
Concord, N.C., Bd. of Lt. & W. Comrs.
Corning, N.Y., W. Dept.
Corpus Christi, Tex., City of
Covington, Ind., City of
Creedmore, N.C., Town of
Crossett, Ark., Pub. Utils. Co.
Crothersville, Ind., W. & Elec. Dept.
Cuba, Cia de Acueducto de, S.A.

Dalton, Mass., Fire Dist.
Day & Zimmerman, Inc.
Delavan, Wis., W. Com.
Delphi, Ind., W.W.
Deming, N.M., W. Dept.
Denver, Colo., City & County of
Deseronto, Ont., Pub. Utils. Com.
Des Moines, Iowa, W.W.
Detroit Edison Co., The
District of Columbia W. Dept.
Dover, N.J., W. Comrs.
Dow Magnesium Corp.
Dresden, Ont., Town of
Du Bois, Pa., Bur. of W.
Dundas, Ont., Pub. Utils. Com.
Dunkirk, N.Y., Bd. of W. Comrs.
Dunn, N.C., Town of
Dunnville, Ont., Pub. Utils. Com.
Durham, N.C., W. Dept.

East Aurora, N.Y., Village of
East Bay Munic. Util. Dist.
East Chicago, Ind., Dept. of W.W.
East Coast W. Co. (Richmond, Va.)
East Helena, Mont., City of
East Moline, Ill., W.W. Dept.
East Orange, N.J., Bd. of W. Comrs.
East York, Ont., Township of
Ebasco Services, Inc.
Ecorse, Mich., City of
Ecusta Paper Corp.
Edmonton, Alta., City of
El Paso, Tex., W. Dept.
Elkhorn, Wis., Lt. & W. Com.
Elmira, N.Y., W. Bd.
Elwood, Ind., W.W. & Sewage Plant
Endicott, N.Y., W.W. Co.
Escanaba, Mich., Munic. Utils.
Etobicoke, Ont., Township of
Eugene, Ore., W. Bd.
Evansville, Ind., W.W. Dept.
Eveleth, Minn., City of
Everett, Wash., W. Dept.

Federal Advisers, Inc.
Fergus Falls, Minn., W. & Lt. Dept.
Fire Underwriters Inspection Bur.
Firestone Tire & Rubber Co.
Fishers Island Farms, Inc.
Flint, Mich., W. Dept.
Florida Keys Aqueduct Com.
Fond du Lac, Wis., City W. Dept.
Forest City, N.C., W.W.
Forest Hill W.W. System (Toronto)
Fort Collins, Colo., City of
Fort Dodge, Iowa, W. Dept.
Franklin Square, N.Y., W. Com.
Fresno, Calif., City W. Dept.

Galesburg, Ill., W. Dept.
Gananoque, Ont., W.W. Com.
Garden City, N.Y., Inc. Village of
Gastonia, N.C., City of
General Utils. Co., Ltd.
Geneseo, N.Y., W.W.
Glen Ridge, N.J., W. Dept.
Glendale, Calif., Pub. Serv. Dept.
Glendora, Calif., W. Dept.
Glens Falls, N.Y., Bd. of W.
Gloversville, N.Y., W.W.
Goldsboro, N.C., City of
Goodrich, B. F., Co.
Goodrich, B. F., Co.—Agent for Rubber Reserve Co.
Grand Rapids, Mich., W. Dept.
Gravenhurst, Ont., Elec. Lt. & W. Com.
Great Falls, Mont., City of
Greece, N.Y., W. Dept.
Greeley, Colo., City of
Green Bay, Wis., W. Dept.
Greenport, N.Y., W. Dept.
Greenport W. Dist. No. 1 (Hudson, N.Y.)
Greensboro, N.C., W. Dept.
Guatemala City, Cia del Agua del Mariscal, S.A.
Guelph, Ont., City of
Gulf States Utils. Co.

Haddonfield, N.J., Borough W. Dept.
Hagerstown, Ind., W. Dept.
Hammermill Paper Co.
Hamtramck, Mich., W. Dept.
Hanover, Ont., Pub. Utils. Com.
Harlan, Ky., Munic. W.W.
Harvey Cedars, N.J., Borough of
Hastings, Neb., Bd. of Pub. Works
Havre, Mont., City of
Hawthorne, Calif., Munic. W.W.
Healdsburg, Calif., City of
Helena, Mont., W. Dept.
Hemp, N.C., W. Dept.
Hempstead, N.Y., Inc. Village of
Henderson, N.C., W.W.
Hibbing, Minn., W., Lt., Power & Bldg. Com.
Hickory, N.C., City of
Hicksville, N.Y., W. Dist.
Hillsboro, N.C., W. Dept.
Hillsboro, Ore., Utils. Com.
Hillsborough W. Dept. (Burlingame, Calif.)
Holland, N.Y., W. Dist. No. 1
Hollister, Calif., W. Co.

Home W. Co. (Royersford, Pa.)
Home W. Dist. (Portland, Ore.)
Honolulu (T.H.) Bd. of W. Supply
Hot Springs, Ark., W. Co.
Houlton, Me., W. Co.
Houston, Tex., W. Dept.
Hudson, N.Y., Dept. of Pub. Works

Idaho Dept. of Pub. Health
Idaho Surveying & Rating Bur.
Idaho, Univ. of
Ilion, N.Y., Bd. of W. Comrs.
Illinois Inspection Bur.
Indiana Dept. of Conservation
Indiana Pub. Serv. Co.
Indiana State Bd. of Health
Inglewood, Calif., W. Dept.
Inst. of W. Engrs. (London, England)
Iowa Geological Survey
Irvington, N.Y., W. Dept.

Jamestown, N.Y., Bd. of Pub. Utils.
Jasper, Ind., Munic. Elec. & W. Dept.
Jerome, Idaho, W. Co.
Johnson City, N.Y., W. Dept.
Joliet, Ill., City of

Kaiser Co., Inc.
Kamloops, B.C., City of
Kansas City, Mo., W. Dept.
Kenosha, Wis., W. Dept.
Kentucky State Bd. of Health
Kentucky Utils. Co.
Kinderhook, N.Y., Village of
Kingston, Ont., Utils. Com.
Kitchener, Ont., W. Com.
Knoxville, Tenn., Elec. Power & W. Bd.
Kure Beach, N.C., W.W.

La Fayette, Ind., W.W.
La Grange Park, Ill., Village of
Laguna Beach County (Calif.) W. Dist.
Lake Forest, Ill., W. Dept.
Lake, Town of, W. Util. Bd. (Milwaukee, Wis.)
Lakewood W. & Power Co. (Long Beach, Calif.)
La Mesa, Lemon Grove & Spring Valley Irrigation Dist.
Lansdale, Pa., Munic. Authority
Lansing, Mich., Bd. of W. & Elec. Lt. Comrs.
La Porte, Ind., W.W.
Lawrence, Kan., City W. Dept.
Lenoir, N.C., W. Dept.
Libbey-Owens-Ford Glass Co.
Liberty, N.Y., W.W.
Lincoln, Neb., City W. & Lt. Dept.
Little Rock, Ark., Munic. W.W.
Livingston, N.J., W. Dept.
Lompoc, Calif., Lt. & W. Dept.
London, Ont., Pub. Utils. Com.
Long Beach, Calif., W. Dept.
Los Angeles, Calif., Dept. of W. & Power
Louisville, Ky., W. Co.
Loveland, Colo., City of
Lower Colorado River Authority (Austin, Tex.)
Lynwood, Calif., City of

Macon, Ga., Bd. of W. Comrs.
Madison Suburban Util. Dist. of Davidson County, Tenn.
Manhasset-Lakeville, N.Y., W. Dist.
Marinette, Wis., W. Com.
Marysville, Mich., W. Dept.
Mason City, Iowa, W. Dept.
McMinnville, Ore., W. & Lt. Dept.
Mead Corp., The
Medford, Ore., W. Com.
Melbourne & Metropolitan Bd. of Works (Australia)
Memphis, Tenn., Lt., Gas & W. Div.
Merritton, Ont., Pub. Utils. Com.
Mexico, Banco Nacional Hipotecario Urbano y de Obras Publicas, S.A.
Miami, Fla., Dept. of W. & Sewers
Middletown, Conn., W. Dept.
Midland, Mich., W. Dept.
Midland, Ont., Pub. Utils. Com.
Milford, Mass., W. Co.
Milford, N.J., W. Dept.
Mimico Pub. Utils. Com. (Toronto)
Mineola, N.Y., W. Dept.
Mineral Wells, Tex., City W.W.
Minersville, Pa., Borough Munic. Authority
Minneapolis Com. of W.W.
Mishawaka, Ind., City W. & Elec. Plant
Mobile, Ala., W.W. Dept.
Moline, Ill., W.W.
Monroe, N.C., City of
Montpelier, Vt., W. Dept.
Mount Airy, N.C., Town of
Mount Holly, N.C., Munic. W. Dept.
Mount Holly, N.J., W. Co.
Mount Morris, N.Y., W. Dept.
Murphysboro, Ill., W. Co.
Muscatine, Iowa, City W.W.

Nassau County, N.Y., Dept. of Health
National Automatic Sprinkler Assn.
National Council for Stream Improvement of Paper, Pulp & Paperboard Industries
National Lead Co.
Neenah, Wis., City W.W.
Nehi Corp.
Nevada Irrigation Dist.
New Jersey State W. Policy Com.
New Jersey W. Co. (Haddon Heights)
New Mexico Power Co.
New Mexico Power Co.—Agua Pura Div.
New Mexico Pub. Serv. Com.
New Rochelle, N.Y., W. Co.
New Toronto, Ont., Pub. Utils. Com.
New Westminster, B.C., City of
New York State Conservation Dept.
Newmarket, Ont., W. & Lt. Com.
Newnan, Ga., W. & Lt. Com.
Newtown, Citizens W. Supply Co.
Niagara, Ont., W. Dept.
Niteroi, Cia Brasileira de Aguas e Esgotos, S.A.
North Bay, Ont., City of
North Carolina, Univ. of
North Creek, N.Y., W. Dist.
North York, Ont., Township of
Northern Indiana Pub. Serv. Co.
Nova Scotia Bd. of Insurance Underwriters
Nutley, N.J., W. Dept.

Oakville, Ont., W. & Lt. Com.
Ocala, Fla., W. Dept.
Oconomowoc, Wis., W. Dept.
Oil City, Pa., Bur. of W.
Olean, N.Y., W. Dept.
Omaha, Neb., Metropolitan Utils. Dist.
Orillia, Ont., W., Lt. & Power Com.
Orlando, Fla., Pub. Utils. Com.
Oshawa, Ont., Pub. Utils. Com.
Ossining, N.Y., Bd. of W. Comrs.
Oswego, N.Y., Dept. of W.
Owatonna, Minn., Munic. Pub. Utils.
Owego, N.Y., W.W.
Owosso, Mich., W. Dept.

Paducah, Ky., W.W.
Palisades del Rey W. Co. (Los Angeles, Calif.)
Palm Springs, Calif., W. Co.
Pampa, Tex., W. & Sewer Dept.
Pan American Refining Corp.
Paris, Ont., Pub. Utils. Com.
Parker Lab.
Pasadena, Calif., W. Dept.
Pattison's Southwest Labs.
Payette, Idaho, W. Dept.
Penetanguishene, Ont., W. & Lt. Com.
Pennichuck W.W. (Nashua, N.H.)
Peoria Heights, Ill., Village of
Peru, Ind., W. Dept.
Peshtigo, Wis., W. Dept.
Peterborough, Ont., Utils. Com.
Philadelphia Suburban W. Co.
Pinehurst, Inc.
Pioneer Asphalt Co.
Pittsburgh Coke & Iron Co.
Plattsburg, N.Y., City of
Pomona, Calif., W. Dept.
Port Hope, Ont., W.W. Com.
Portland, Ore., Bur. of W.
Poughkeepsie, N.Y., Bd. of Pub. Works
Preble W. Dept. (Green Bay, Wis.)
Preston, Ont., Lt. & W. Com. on Pub. Utils.
Princeton, Ill., W. Dept.
Providence, R.I., W. Supply Bd.
Proximity Mfg. Co.
Publicker Commercial Alcohol Co.
Pure W. Co., Inc. (Logan, W. Va.)
Purity Springs W. Co. (Tampa, Fla.)

Quebec, Que., Pub. Serv. Bd.
Quincy, Ill., W.W. Com.

Raleigh, N.C., W. Dept.
Ramsey, N.J., W.W.
Randleman, N.C., City of
Reading, Pa., Bur. of W.
Red Wing, Minn., Bd. of W. Comrs.
Regina, Sask., W.W. Dept.
Remington Arms Co., Inc.
Rensselaer, Ind., W. & Lt. Dept.
Renton, Wash., City of
Rheem Mfg. Co.
Ridgetown, Ont., Pub. Utils. Com.
Riverside, Calif., W. Dept.
Rock Island, Ill., W. Dept.
Rockaway, N.J., Borough W. Dept.
Rome, N.Y., Bur. of W.
Rouses Point, N.Y., Village of
Rubber Reserve Co.

Sacramento, Calif., Div. of W.
St. Clair, Mich., City of
St. Marys, Ont., Pub. Utils. Com.
St. Paul, Minn., Bd. of W. Comrs.
St. Thomas, Ont., Pub. Utils. Com.
Salem, N.J., W. Dept.
Salem, Ore., W. Com.
Salina, Kan., W. Dept.
Salt Lake City, Utah, Corp. W. Dept.
San Antonio, Tex., City W. Bd.
San Bernardino, Calif., Bd. of W. Comrs.
San Bernardino County Flood Control Dist.
San Diego, Calif., W. Dept.
San Dimas-Charter Oak (Calif.) Domestic W. Co.
San Fernando, Calif., W. Dept.
San Francisco, Calif., W. Dept.
San Gabriel (Calif.) County W. Dist.
San Jose, Calif., W.W.
Santa Ana, Calif., City of
Santa Ana Valley Irrigation Co.
Santa Barbara, Calif., City of
Santa Monica, Calif., City of
Saticoy, Calif., W. Co.
Sayre, Pa., W. Co.
Scarborough Pub. Utils. Com. (Toronto)
Schenectady, N.Y., City of
Scranton-Spring Brook, Pa., W. Serv. Co.

Seattle, Wash., W. Dept.
Seneca Falls, N.Y., W. Dept.
Sewickley, Pa., Comrs. of W.W.
Sheboygan, Wis., Bd. of W. Comrs.
Shenango Valley W. Co.
Sherrill-Kenwood, N.Y., W. Com.
Sierra Pacific Power Co.
Siler City, N.C., Town of
Silver City, N.M., W. Dept.
Silver Creek, N.Y., W.W.
Simcoe, Ont., Pub. Utils. Com.
Sioux Falls, S.D., W.W.
Skagit County (Wash.) Pub. Util. Dist. No. 1
South Jersey Assn. of W. Supts.
South Pasadena, Calif., City of
Southern California W. Co.
Spokane, Wash., City of
Springfield, Ill., City W., Lt. & Power Dept.
Statesville, N.C., City W. Dept.
Staunton, Va., City of
Sterling, Colo., City of
Strathroy, Ont., Pub. Utils. Com.
Stuttgart, Ark., Munic. W.W.
Suburban W. Co. (San Francisco)
Suburban W. Co. (Verona, Pa.)
Syracuse, N.Y., Dept. of Eng.

Tavistock, Ont., Pub. Utils. Com.
Technical Assn. Pulp & Paper Industry
Teck, Ont., Township of
Tennessee Eastman Corp.
Texas Gulf Sulphur Co., Inc.
Texas W. Co. (Fort Worth)
Tilbury, Ont., Pub. Utils. Com.
Tillsonburg, Ont., Pub. Utils. Com.
Timmins, Ont., Corp. Town of
Tomahawk, Wis., Munic. W. Util.
Tonawanda, N.Y., Town of
Toronto Dept. of Works
Trenton, N.J., W.W.
Trenton, Ont., Pub. Utils. Com.
Troy, N.Y., Bur. of W.
Tulsa, Okla., W. Dept.
Tupper Lake, N.Y., Munic. W. System
Tuscaloosa, Ala., City of
Two Harbors, Minn., City of

Utah State Dept. of Health

Valdese, N.C., W.W.
Vallejo W. Co. (San Francisco)
Ventura, Calif., City W. System
Vernon, Calif., City of
Vineland, N.J., Borough W. Dept.

Wake Forest, N.C., Town of
Wallaceburg, Ont., W. Com.
Washington, D.C., Suburban San. Com.
Washington W. Power Co.
Waterford, Ont., Pub. Utils. Com.
Waterloo, Iowa, W.W.
Waverly, N.Y., W. Dept.
Wayne County (Mich.) Bd. of Road Comrs.
Weldon, N.C., W.W.
Welland, Ont., Bd. of W. Comrs.
West Lafayette, Ind., W.W. Co.
West Palm Beach, Fla., W. Co.
West Reading, Pa., Borough of
West Texas Utils. Co.
West Virginia Pub. Serv. Com.
Westbury, N.Y., W. Dist.
Westchester County (New York) Dept. of Health
Wharton, N.J., Bd. of Pub. Works
Whitby, Ont., Pub. Utils. Com.
White Plains, N.Y., Dept. of Pub. Works
Whitney, Ont., Township of
Whittier, Calif., City of
Wichita, Kan., City of
Williston Park, N.Y., Inc. Village of
Wilson, N.C., W.W.
Windsor, Ont., Utils. Com.
Winona, Minn., Bd. of W. Munic. Works
Woonsocket, R.I., W. Dept.

York, Ont., Township of
Ypsilanti, Mich., City of

# ASSOCIATE MEMBERS

*With name of official representative to A.W.W.A. and address*

**Acadia Synthetic Products Div.,** H. N. Vickerman, 4029 Ogden Ave., Chicago 23, Ill.

**Allis-Chalmers Mfg. Co.,** H. P. Binder, Mgr., Centrifugal Pump Dept., Milwaukee 1, Wis.

**Ambursen Engineering Corp.,** S. W. Stewart, Secy., 295 Madison Ave., New York 17, N.Y.

**American Brass Co.,** F. G. Smith, 414 Meadow St., Waterbury, Conn.

**American Cast Iron Pipe Co.,** Lester Long, Box 2603, Birmingham, Ala.

**American City, The,** Edgar J. Buttenheim, 470 Fourth Ave., New York 16, N.Y.

**American Colloid Co.,** Paul Bechtner, Pres., 363 W. Superior St., Chicago 10, Ill.

**American Concrete Pipe Assn.,** M. W. Loving, Cons. Engr., 33 W. Grand Ave., Chicago 10, Ill.

**American Cyanamid & Chemical Corp.,** J. D. Lowery, 30 Rockefeller Plaza, New York 19, N.Y.

**American Foundry & Mfg. Co.,** 1015 Hebert St., St. Louis 7, Mo.

**American Iron & Steel Institute,** E. H. Thwaits, Research Engr., 350 Fifth Ave., New York 1, N.Y.

**American Pipe & Construction Co.,** Robert V. Edwards, Vice-Pres., Box 3428 Terminal Annex, Los Angeles 54, Calif.

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**Brisbane:** Ham

**Buena Park:** Allin

**Burbank:** Bates, Pub. Serv. Dept., Shipley

**Burlingame:** Hillsborough W. Dept., Schuck

**Camp Beale:** Van Pelt

**Camp San Luis Obispo:** McKeen

**Campbell:** Hyde, Silberbauer

**Carmel:** Neill

**Centerville:** Alameda Co. W. Dist.

**Chico:** Hendrix

**Claremont:** Balch

**Colton:** Maxwell, McKersie

**Compton:** Boardman, Park

**Corona:** Scoville

**Covina:** Snodgrass

**Culver City:** Cleveland

**Dinuba:** Green

**Downey:** Williamson

**El Cerrito:** Heddell

**El Monte:** Bader, Cleminson, Ells, Martin, Moseley

**Elsinore:** Albright

**Emeryville:** George P. Forni

**Escondido:** Foerster

**Eureka:** Coupal

**Fall Brook:** White

**Fontana:** Hasbrouck, Kaiser Co. Inc.

**Fortuna:** Lessley

**Fresno:** Ashley, Fresno City W. Dept., Hall, Leavitt

**Fullerton:** Humphreys, Walters

**Glendale:** Atlas Carbon & Clay Corp., McIntyre, Pub. Serv. Dept., Skinner

**Glendora:** Warren, W. Dept.

**Grass Valley:** Nevada Irrigation Dist.

**Greenville:** Bidwell

**Hanford:** Isaac

**Hawthorne:** Desmond, Lloyd, Munic. W.W.

**Hayward:** Fry

**Healdsburg:** City of Healdsburg

**Hollister:** Hollister W. Co.

**Hollydale:** Dayton Fdry. Inc., Rogers

**Huntington Park:** R. H. Baker Co. Inc., Knott, Link, Non-Corrosive Products Co., Robinson

**Hynes:** Duke

**Independence:** Krater, Lewis, Parratt, Phillips, Ritch

**Inglewood:** Inglewood W. Dept.

**La Canada:** Carpenter, Hicks, Richards

**La Crescenta:** Scheuner

**Laguna Beach:** Laguna Beach Co. W. Dist.

**La Jolla:** Foster

**La Mesa:** Harritt, La Mesa Lemon Grove & Spring Valley Irrigation Dist.

**La Verne:** Aultman, Bowers, Pearson, Preston

**Lindsay:** Maas, Trauger

**Lomita:** Cook, Lucas

**Lompoc:** Lompoc Lt. & W. Dept.

**Long Beach:** Brown, Harmon, Lakewood W. & Power Co., Long Beach W. Dept., Porter, Tallon, Taylor, Thomas, Thompson

**Los Angeles:** Alexander, Am. Pipe & Constr. Co., Anderson, Ashline Barclay, Benedict, Bennett, Berliner, Bird, Boen, Boezinger, Bovee, Brammam, Breitkreutz, Brewer, F. Brooks, T. Brooks, Brown, Bundy, Buratti, Byron Jackson Co. Camp, Camy, Carlton, Carmien, Carney, Cassidy, Chapin, Chapton, Chase, Christiansen, Clark, Clot, Consolidated Steel Corp. Ltd., Cooper, Copeland, Cowan, Curry, Cutler Dandridge, Dept. of W. & Power, Derby, Diemer, Dill, Dudley, Dunham, Dunn, Durant Ebright, H. L. Edwards, R. V. Edwards, Egan, Elder, Erickson, Estey, Evans Fenton, Ferem, Field, Fitzgerald, Flexible Sewer Rod Equip. Co., Fox, Francis, Frank, Fraser Cement Products Co., Frick C. W. Gardner, R. T. Gardner, Ghiotto, Goit, Goudey, Graham, Grant, Green, Gresham Harmon, Harnish, Harwood, Hayes, H. B. Hemborg, R. E. Hemborg, Hill, Hinds, Howard Supply Co., Hubbard, Hurlbut Isaacson, Itter Jacques, Johnson, J. E. Jones, James Jones Co. Inc., W. B. Jones Kelley, Kivari, Koebig, Kugler Lake, Larson, Lavelle, Laverty, Lawson, Leahey, Lewis, Lohman Bros. Inc., Lugo, Luippold Macnee, Mamrelli, Manock, Mayer, McArdle, McClees, Merrithew, Mikesell, Miles, Montgomery, Moss, Mowder Nelson, Northrop O'Leary, Olson Palisades del Rey W. Co., Pohl, Price Rawn, Reliable Iron Fdry. Inc., Rener, Rich Mfg. Co. Ltd., Ridenour, Rider, Ross, Ruckman, Rudser, Russell Sanchis, Schuhmacher, Shank, Sharp, Shildmyer, Shonerd, Shull, Siegel, Skinner, E. O. Slater, L. N. Slater, Sloat, Small, Snook, Snyder, Socha, Sonderegger, Sopp, Southern Calif. W. Co., Sparks, R. C. Sparling, R. W. Sparling, Stevenson, Swanson, Swinney Thacker, Thayer, Thompson, Tibbett, Townsend, Twohy Vail, Van Meter, C. H. Van Norman, D. M. Van Norman, Volk Waite, Webb, Weight, Weir, Welch, Welmon, Western City Magazine, White, Whitman, C. Wilson, O. Wilson, Wyckoff

**Los Banos:** Ellis

**Lynwood:** City of Lynwood

**Madera:** Cook

**Manhattan Beach:** Gierlich, Imus

**Mar Vista:** Averett

**Martinez:** Kelleher, Nutting

**Maywood:** McCann, Rohm, Winger

**McKittrick:** Willis

**Menlo Park:** Cook, Ruth

**Mentone:** Tate

**Merced:** Casad

**Mill Valley:** Shaler

**Millbrae:** Keyak, Medbery, Tracy

**Mira Loma:** Courtney

**Modesto:** Beard, Davis

**Mojave:** Fleming

**Monrovia:** Streicher, Tonglet

**Montebello:** Gregory

**Monterey:** Beenfeldt, Goldsworthy, Lyon

**Mountain View:** Sohler

**National City:** Gibbs, Hess, Williamson

**Newport Beach:** Patterson

**Niles:** Glassbrook

**North Hollywood:** Franklin, Owen, Poling

**Oakland:** Burnson, Daniels, DeCosta, Driggs, East Bay Munic. Util. Dist., Faw, Forgey, Hall, Hersey, Hommon, Hunter, Jordan, Kennedy, Knudsen, Longwell, Love, Moullet, Noel, Osborn, Read, Shaw, Stevens, Traver, Wintz

**Oceanside:** Weese

**Ontario:** Smith

**Orange:** Santa Ana Valley Irrigation Co., Thompson

**Oxnard:** Isham

**Palm City:** Myers

**Palm Springs:** W. Co.

**Palo Alto:** Anderson, Fisher Research Lab., Jenks, May

**Palos Verdes Estates:** Haggott

**Parlier:** Herring

**Pasadena:** Art Concrete Works, Banks, Banta, Blackburn, Cates, Jerauld, D. Jones, M. S. Jones, Koster, Lynde, Metcalf, Mills, Olsen, Pomeroy, Ritzel, Ross, Sopp, Thomas, W. Dept.

**Paso Robles:** French, Jacques

**Pico:** Robinson

**Piedmont:** Rodolf

**Pittsburg:** Enes, Heck

**Playa del Rey:** Lamar, McKee

**Pomona:** Cain, Fox, W. Dept.

**Presidio of San Francisco:** Gibson

**Rancho Santa Fe:** Bakewell

**Redondo Beach:** Parbury

**Redwood City:** Mead

**Reedley:** Smith

**Represa:** Hasselgren

**Rivera:** Collins

**Riverside:** Kennedy, W. Dept.

**Rosamond:** Kelsey

**Sacramento:** Conkling, Div. of W., Harden, Hoskinson, Klaus, Pratt

**Salinas:** Adcock, Patterson

**San Bernardino:** Bd. of W. Comrs., Coughlin, Currie, Hosegood, Maloy, Perry, San Bernardino Co. Flood Control Dist.

**San Carlos:** Barbee

**San Clemente:** Bennett

**San Diego:** Beerman, Campbell, Dodson, Edwards, Hodges, Jorgensen, Meyer, Rhodes, Smith, Stockman, W. Dept., Williams

**San Dimas:** San Dimas-Charter Oak Domestic W. Co.

**San Fernando:** Walker, W. Dept.

**San Francisco:** Abbott, Albert, Andrews, Arnold, Bacon, Badger, Barker, Bauer, Benas, Blair, Bovard, Bragg, Brown, Chem. Process Co., Cook, Doyle, Eckart, Elsener, Flaa, Fraschina, Gill, Great Western Div., M. Greenberg's Sons, Hausmann, Hershman, Hunter, Jack, Keirn, Kempkey, Kennedy, Knoedler, Lane, Lee, Loveland, MacKall, Martindale, McAtee, McCallum, McCloskey, McGrath, McKay, Mowat, Nenzel, O'Connell, Pelton W. Wheel Co., Peterson, Pingree, Pirnie, Porter, Pracy, Reinhardt, Renshaw, Roberts, Schimberg, Smith, Spratling, Stava, Suburban W. Co., Toman, Vallejo W. Co., Walton, W. Dept., W. W. Supply Co., Webster, Western Pipe & Steel Co. of Calif., White, Wilkins

**San Gabriel:** Ebaugh, Jessup, San Gabriel Co. W. Dist.

**San Jacinto:** Stone

**San Jose:** Blumberg, Dodge, Ford, Green, Harris, Hutton, Mau, Rossum, Villarruz, W.W.

**San Marino:** Arnold, Fiscus, Gram, Hudson

**San Pedro:** Ludwig, Monro

**San Rafael:** Peters

**Santa Ana:** Blakeley, Dierker, Neighbour, W. Dept.

**Santa Barbara:** City of Santa Barbara, Pinkham, Sexton, Smith, Wyant

**Santa Clara:** Dixon

**Santa Cruz:** Cooper, Sousa, Steffani, Tait

**Santa Maria:** Keeler

**Santa Monica:** City of Santa Monica, Hostrup, Van Benschoten

**Santa Paula:** Giacomazzi

**Saticoy:** Saticoy W. Co.

**Sebastopol:** Fellers

**Sierra Madre:** Swanson

**Signal Hill:** Irvine

**Sonora:** Segerstrom

**South Gate:** Alderman, Brisbane & Co.

**South Pasadena:** City of South Pasadena, Goodspeed, Mudge

**South San Francisco:** Smith-Blair Inc.

**Stanford University:** Morris, Reynolds

**Stockton:** Rammer, Suters

**Sunnyvale:** Coates, Pomona Pump Co.

**Torrance:** Quandt, Stanger, Wirz

**Tustin:** Browning
**Twentynine Palms:** Abell
**Vallejo:** Maker
**Van Nuys:** Bascom, Golden, Smith, Williams
**Venice:** Harris, Klein, Vicini
**Ventura:** City W. System
**Verdugo City:** Carter
**Vernon:** City of Vernon
**Visalia:** Stolp
**Vista:** Mull
**Watsonville:** Hushbeck
**West Berkeley:** Calif. Corrugated Culvert Co.
**Whittier:** City of Whittier, N. M. Launer, R. E. Launer, Wendt
**Wilmington:** Indus. Eng. Co., Kraft
**Yorba Linda:** Lewis
**Yreka:** Thomas

## COLORADO

**Alamosa:** Bollier
**Boulder:** Chaney, W. Dept.
**Brighton:** Samson
**Brush:** Harness
**Canon City:** W. Dept.
**Climax:** Wamsley
**Colorado Springs:** Bryson, Truman, Willis
**Denver:** Bardwell, Brennan, Brown, Burgess, Chadwick, City & Co. of Denver, Crane, Davis, Evans, Garrett, Gross, Hinkle, Hoop, Howe, Kepner, Krieger, Lowther, Lyndes, Mars, McGowan, McLaughlin, Millikin, Mulligan, Thompson, Tracy, Turre, Warner, Werth
**Estes Park:** Tallant
**Fort Collins:** City of Fort Collins
**Grand Junction:** Brownson
**Greeley:** City of Greeley
**Gunnison:** Keenan
**Lamar:** Blizzard
**Leadville:** Anderson
**Littleton:** Binner, Ripple
**Loveland:** City of Loveland
**Montrose:** Hill
**Palisade:** Nisbet
**Pueblo:** Porter, Wagner
**Sterling:** City of Sterling
**Trinidad:** Gregory
**Wray:** Buhler

## CONNECTICUT

**Ansonia:** Bristol
**Bloomfield:** Williamson
**Bridgeport:** Bridgeport Brass Co., Rothman, Senior
**Bristol:** Thiery
**Danbury:** Tarlton
**Darien:** Phoenix
**Derby:** Birmingham W. Co.
**Hartford:** Dillon, Gentner, Griswold, Minkus, Newlands, Peck, Rudd, Saville
**Middletown:** W. Dept.
**Mystic:** Chase
**Naugatuck:** Moody
**New Britain:** Holden
**New Canaan:** Glidden
**New Haven:** Blair, Jacobson, Minor
**Noroton:** Provost
**Norwalk:** Riordan
**Putnam:** Fahlstrom
**Stamford:** Ketcham
**Storrs:** Booth
**Southington:** Bowers
**Thompsonville:** Schwabe
**Torrington:** Travis
**Waterbury:** Am. Brass Co., Chase Brass & Copper Co., Scott-Smith
**West Hartford:** Scott
**Westport:** Darby, Thompson
**Winsted:** Walsh

## DELAWARE

**Bellevue:** Van Trump
**Dover:** Beckett
**Wilmington:** Baumgartner, Feeney, Phelps, Showell, Wills

## DISTRICT OF COLUMBIA

**Washington:** Allen, Ballou, Barker, Baty, Beckett, Boyce, Brumbaugh, Coe, Collins, Corbin, DeMartini, D.C. W. Dept., Drane, Fiedler, Fink, Frisk, Geupel, Gorman, Gotaas, Harrington, Henson, Hoskins, Jones, Kappe, Lauter, Lawrence, Leach, Linderman, Logan, MacKenzie, Macqueen, McClung, Meinzer, Patton, Picton, Radcliffe, Ridgway, Rohlich, Sassani, Sayre, Schmitt, Sette, Shaw, Sherman, Snow, Stringfield, Sullivan, Tarbett, Vosburgh, Wilberding, Williams, Wood

## FLORIDA

**Arcadia:** Davis
**Bradenton:** Armstrong, Paul
**Canal Point:** Jones, Kingsley
**Clearwater:** Keller
**Clewiston:** City of Clewiston
**Coconut Grove:** Thomas
**Daytona Beach:** Brennan, Williamson
**Fort Lauderdale:** Boord, Fiveash, Johnson, MacQuarrie, Mimms, Robbins, Rode, Schmuck, Sherwood, Vickery
**Fort Myers:** Gibson
**Fort Pierce:** Gahn
**Gainesville:** Black, Emerson, Hutson, Reid, Rothe
**Homestead:** Stephenson
**Jacksonville:** Burnett, Eidsness, Garland, Helwick, Herring, Hobart, Hoy, Jenson, Jones, Lauramore, Lee, Lutz, McCall, Miller, Murchison, Richheimer, St. John, Smith, Timmons, Tyler, Van Reenen, Vinson, Ward, Weaver, Wells, Williamson
**Key West:** Florida Keys Aqueduct Com.
**Lake Wales:** Solomon
**Leesburg:** Newman
**Melbourne:** Stickel
**Miami:** Ashe, Borton, Brehm, Carothers, Connell, Dept. of W. & Sewers, De Wolf, Dowling, Henry, Hurst, Hyman, Johnson, Kononoff, McCune, Parks, Pizie, Preston, Riley, Steven, Sydow, Weigand, Wertz, Woodall, Wright
**Miami Springs:** Knox
**Ocala:** Dixie Lime Products Co., Ferguson, W. Dept.
**Orlando:** Cousins, Croll, Finley, Johnson, Norris, Pub. Utils. Com.
**Ormond:** Young
**Panama City:** Gillespie, Shapiro
**Perry:** Blue
**Pensacola:** St. John, Semmes
**St. Augustine:** Earls
**St. Petersburg:** Gasser, Lee, Oberly, Ridgely
**Sarasota:** Carlson, Dodd, J. B. Green Plumbing & Equip. Inc.
**Sebring:** Durrance, Winchester
**Tallahassee:** Cooper, Gunter
**Tampa:** Brash, Calderara, Hamilton, Johnson, Langston, Long, Lyles, McEldowney, Purity Springs W. Co., Reeves
**Tavares:** Chester
**West Palm Beach:** Chinn, Conk, Culter, Rice, W. Co.
**Winter Haven:** Ingols
**Winter Park:** Smith

## GEORGIA

**Athens:** Beacham
**Atlanta:** Alexander, Avrett, Bauer, Bingley, Bleckley, Brannen, Cady, Cissna, Clarkson, Coca-Cola Co., Collier, Cutter, Davis, De Jarnette, Dishner, Ellis, Frith, Gilbertson, Hall, Henley, Hicklin, Hodgson, Hopper, Houston, Houze, A. C. Johnson, W. W. Johnson, Kahn, Kaiser, Lenert, Lewis, Maddox, McKee, Mees, Melcher, Moore, Patton, Pebworth, Prodanovich, Reynolds, Rice, Roberts, Russell, Scott, Shuff, Smedberg, Smith, Stillwell, Storey, Taulman, Terrill, Thoman, Thompson, Thomson, P. Weir, W. H. Weir, Wiedeman, Wilcox, Wilkes, Wyckoff
**Augusta:** Cooper, Jacobs, Wylds
**Bainbridge:** Rich
**Brunswick:** Harper, Killian
**Cartersville:** Crane
**College Park:** Whelchel
**Columbus:** Dudley, Lowe, Nehi Corp.
**Dalton:** Jones
**Decatur:** Weaver
**East Point:** Hull, Sparks
**Elberton:** Wallis
**Fort Benning:** Elliott, Naehr
**Fort Valley:** Jones
**Griffin:** Bryant, Simonton
**Hartwell:** Baker
**Jonesboro:** Brown
**La Grange:** Sargent
**Macon:** Baggarly, Bd. of W. Comrs., Matthews
**Milledgeville:** Hartman
**Newman:** Perryman, W. & Lt. Com.

**Rome:** Angle, Hamler
**Sandersville:** Thomason
**Savannah:** East
**Thomaston:** George
**Thomasville:** Dawes, Mathews
**West Point:** Brown
**Winder:** Whaley

### IDAHO

**Boise:** Briggs, Butler, Flood, Idaho Dept. of Pub. Health, Idaho Surveying & Rating Bur., Jackson
**Bonners Ferry:** Buroker
**Burley:** City of Burley
**Coeur D'Alene:** Hill
**Farragut:** Anderson
**Jerome:** W. Co.
**Lewiston:** Berkeley, Hughes, Wilson
**Moscow:** Early, Univ. of Idaho
**Orofino:** Hallam
**Payette:** W. Dept.
**Pocatello:** Rainey
**Sandpoint:** Heiner
**Shoshone:** Terry
**Wallace:** Citizens Utils. Co.

### ILLINOIS

**Alton:** Mississippi Lime Co.
**Aurora:** Am. Well Works Inc., Deuchler, Duy, Mitchell, Sperry
**Benton:** Garner
**Bloomington:** Eldred, Stutz, Woltman
**Brookfield:** Brookfield-North Riverside W. Com., J. P. Miller Artesian Well Co.
**Cairo:** Hileman
**Canton:** Miller
**Carbondale:** Fore
**Carlinville:** Adams
**Carlyle:** Gilcrest
**Centralia:** City W. Dept.
**Champaign:** Amsbary, Johnstone, Ogden, Wilson
**Chicago:** Abplanalp, Acadia Synthetic Products Div., Allen, Am. Colloid Co., Am. Concrete Pipe Assn., Anderson, Anglim Barksdale, Barrett, Barron, Baylis, Beckman, Behrman, Berry, Birch Mfg. Co., Bird, Birkeness, C. N. Brown, J. R. Brown, Brune, Burdick, Burgess, Burns, Burt Carlisle, Chicago Bridge & Iron Co., Chicago Pump Co., Clarke, James B. Clow & Sons, Colston, Connolly, Consoer, Coughlan, Crane Co., Crawford, Cullen Dallach, Damann, Davis, Dearborn Chem. Co., DeBerard, DeLeuw, Denney, Dunmire Egan, Egebrecht, Engel, Erickson, Everson Mfg. Co. Fager, Fisher, Fishtein Gayton, General Chem. Co., Gerstein, Getz, Goldsmith, Gordon, Graham, Gray, Greeley, Groner D. W. Haering & Co. Inc., J. P. Harris, S. W. Harris, Hauck, Hendricks, Hill, Hiskey, Holmes, Horstmann, Hudson, Hyatt Illinois Inspection Bur., Infilco Inc. Jewell, D. W. Johnson, S. C. Johnson, Judge Kneer, Knowles, Kreuch, Kuehn Langdon, Leland, Lessard, Lingnor, Lippert, Loudenback, Lovett Mabbs Hydraulic Packing Co., F. P. Macdonald, G. C. MacDonald, R. I. MacDonald, MacPherson, Martin, Mason, Massey Concrete Products Co., Maxwell, McClenahan, McDonald, McDonough, Mitchell, Mohlman, Mortenson, Mrva, Munn National Aluminate Corp., Nelson, Niles, Noble Olson Pearse, Phillips, Pioneer Asphalt Co., Portland Cement Assn., Pratt, Price Randlett, Reece, Reinert, Rettig, Reynolds, Riedel, Robinson Schmid, Seidensticker, Sharp, Shaw, Sheridan, Sherwood, Slee, Snow, Stannard Power Equip. Co., Stathas, Steffen, Stephanoff, Sybrandt Tatnall, Towns, Tullgren Veggeberg W.W. & Sewerage, Weir, Welch, Weldon, Wolfe Yates
**Chicago Heights:** Bement
**Cicero:** Nedwed
**Danville:** Bardwell, Ell, Ely
**Decatur:** Cazier, Davis, Greenfield, Hatfield, Hines, Mueller Co., Sattley, Van Praag, Warren
**Des Plaines:** Lucey
**Dixon:** Coe
**Downers Grove:** Baylor
**East Moline:** W.W. Dept.
**East Peoria:** Weeber
**East St. Louis:** Horner, Roos, Stradling
**Edwardsville:** Fiesler
**Elgin:** Lloyd, Scarritt, Trentlage, Walker
**Elmwood Park:** Richards
**Evanston:** Evans, Frye, Lund, Quimby, Rose
**Flora:** Hudson
**Flossmoor:** Konsack
**Forest Park:** Prehn
**Freeport:** Hutchins, Leland
**Galesburg:** City W. Dept.
**Geneva:** Hellstrom
**Glen Ellyn:** Fortin
**Glencoe:** Birdsall, Pflanz, Young
**Harvey:** Mallstrom
**Highland Park:** Prindle
**Highwood:** Rosalini
**Hinsdale:** Agrimonti, Howson
**Jacksonville:** Caldwell
**Joliet:** City of Joliet, Haywood
**Kankakee:** Minor, J. W. Mortell Co.
**Kenilworth:** Ruston
**Kewanee:** Todd
**La Grange:** Fulkman, Krause
**La Grange Park:** Village of La Grange Park
**Lake Forest:** W. Dept.
**Lockport:** Enz
**Mattoon:** H. W. Clark Co., Goetz, Parlett
**Moline:** Moline W.W.
**Monmouth:** Jessen
**Murphysboro:** W. Co.
**Nokomis:** McCaslin
**Normal:** Smith
**North Chicago:** Hebior
**Northbrook:** Culligan Zeolite Co.
**Oak Lawn:** De Ruiter
**Oak Park:** Dutton, Jones
**Olney:** Lurvey
**Ottawa:** Farnsworth
**Pana:** Ashcraft
**Park Ridge:** Hawkins
**Pekin:** Doren
**Peoria:** Austin, Morrow, Walker
**Peoria Heights:** Village of Peoria Heights
**Pontiac:** Ebert, Murphy
**Princeton:** Moran, W. Dept.
**Quincy:** Gelston, W.W. Com.
**Robinson:** Schneider
**Rock Island:** W. Dept.
**Rockford:** Merz
**Seneca:** Alt
**Silvis:** Dixon
**Springfield:** Black, Bonn, City W. Lt. & Power, Clark, Downer, Klassen, Larson, Polk, Spafford, Spaulding, Thomas, Tolburg
**Steger:** Pennington
**Sterling:** Moomau
**Streator:** Adams, Hord, Miller, Mitchell
**Urbana:** Babbitt, Bays, Buswell, Doland, Enger, Gerber, Larson, Mason, Pickels, Suter, White
**Villa Park:** Hartmann
**Warsaw:** Kimberley
**Waukegan:** Domke, Swope
**West Chicago:** Roahrig
**Western Springs:** Simantel
**Westville:** Slazas
**Wilmette:** DeBerard
**Winnetka:** French, Miller
**Wood River:** Penning
**Woodstock:** Corr
**Zion:** Craig

### INDIANA

**Albany:** Shaw
**Anderson:** City of Anderson
**Argos:** Hill
**Auburn:** Romeiser
**Batesville:** Schwier
**Bedford:** Norman
**Bicknell:** Conrad, De Hart
**Bloomington:** Crafton, Elford
**Bluffton:** Freeland
**Brazil:** City W.W.
**Butlerville:** Schoolcraft
**Carmel:** Brattain
**Charlestown:** Dodd
**Chesterton:** Weisemann
**Columbus:** Cook

**Connersville:** Loyd
**Corydon:** Windell
**Covington:** City of Covington
**Crawfordsville:** Mallery
**Crothersville:** W. & Elec. Dept.
**Decatur:** Roop
**Delphi:** Delphi W.W.
**Dugger:** Teasleef
**East Chicago:** Dept. of W.W., Graver Tank & Mfg. Co. Inc.
**East Gary:** Daugherty
**Edinburg:** Buck, Hinshaw, Patterson
**Elkhart:** Clark, Corns
**Elwood:** W.W. & Sewage Plant
**Evansville:** Henning, Monroe, Schmitt, Stilwell, W.W. Dept.
**Fort Branch:** Redman
**Fort Wayne:** Baals, Farrell, Fulkerson, Hawley, Keen, Lewistown Pipe Co., Mathews, Milligan
**Frankfort:** Stern
**Franklin:** Foist, Riggs
**Garrett:** Klinker
**Gary:** Mathews, Sandbach
**Glenwood:** Thatcher
**Goodland:** Hotler
**Goshen:** Stack
**Greencastle:** Stewart
**Greenfield:** Frazier
**Greensburg:** Rimstidt
**Hagerstown:** W. Dept.
**Hammond:** Besozzi, Firth, Northern Indiana Pub. Serv. Co., Vaughn
**Huntingburg:** Grewe
**Huntington:** Shultz
**Indianapolis:** Bevington, Boggs, Calvert, Campbell, Carroll, Carter, Condrey, Couch, Coughlen, Crabill, Dougherty, Fassnacht, Finch, Frame, Garman, Hale, Heider, Horstman, Indiana Dept. of Conservation, Indiana State Bd. of Health, Jackson, Jeup, Kinney, Kirch, Klaer, Kleinhenz, Kulin, Louis, Lux, Mabee, Matthews, Mauch, Merrick, Miller, Moore, Morse, Niemeyer, Nihiser, Ohge, Perrine, Poole, Pub. Serv. Co. of Indiana, Quinn, Reed, Reilly Tar & Chem. Corp., Schwier, Susanke, Swingley, Trubnick, Uhl, Universal Constr. Co., Universal Gear Corp., Wenger, Wilson
**Jasonville:** Oeffler
**Jasper:** Munic. Elec. & W. Dept.
**Jeffersonville:** Sudhoff
**Kendallville:** Ludlow
**Knightstown:** Hewitt
**Knox:** White
**Kokomo:** Evans, Stearns
**La Fayette:** Bloodgood, W.W., Wiley
**Lagrange:** Smith
**La Porte:** La Porte W.W.
**Lawrenceburg:** Baer, A. D. Cook Inc.
**Lebanon:** Burrin
**Ligonier:** Spurgeon
**Madison:** Prather
**Marion:** Wilson
**Markle:** Boulware
**Michigan City:** Coote, Draves, Rian
**Mishawaka:** City W. & Elec. Plant, Gunderson
**Monon:** Qualkenbush
**Mooresville:** Steel Protection & Chem. Co. Inc.
**Muncie:** Newquist, Self
**Nappanee:** Uline
**New Albany:** Adams, Moore, Schaefer
**New Castle:** Scholl
**Noblesville:** Klotz
**Osgood:** Brooks
**Oxford:** Reynolds
**Paoli:** Lashbrook
**Peru:** Schlie, W. Dept.
**Plymouth:** Brown
**Portland:** Emerson
**Princeton:** Ellington
**Rensselaer:** W. & Lt. Dept.
**Richmond:** Shoemaker
**Rochester:** Gordon, Owen
**Rockport:** Huffman
**Rushville:** Caldwell, Jeffrey
**Salem:** Languell
**Scottsburg:** Robbins
**Seymour:** Stoldt
**Shelbyville:** Gutting
**South Bend:** Cain, Cole, Laramy, M. B. Skinner Co., Williams
**Speed:** Dold
**Speedway:** Schoenewey
**Tell City:** Bemuel
**Terre Haute:** Durbin, Hardman, McGurk
**Tipton:** Sharp
**Valparaiso:** Bradley, Fraser
**Versailles:** Evans
**Vincennes:** Schwartz
**Wabash:** Ford, Ford Meter Box Co., Hartman
**Walkerton:** Rearick
**Washington:** Gutsch
**West Lafayette:** Howland, W.W. Co.
**West Terre Haute:** Boling
**Whiting:** Bartuska
**Worthington:** Bailey
**Zionsville:** Moore

## IOWA

**Ames:** Levine, W. Dept.
**Boone:** W. Dept.
**Burlington:** Driftmier, Thompson
**Cedar Rapids:** Blomquist, City W.W., Green
**Center Junction:** Sieveka
**Centerville:** Alexander
**Clarence:** Fisher
**Clinton:** Evrard, Meeker
**Council Bluffs:** Flynn, Haas, Harrison, Jensen, Marsh, Storm, Young
**Creston:** Russell
**Des Moines:** Corcoran, Des Moines W.W., Iowa Valve Co., D. L. Maffitt, H. C. Maffitt, Tenny, Thorpe, Wieters
**Dubuque:** Hail, A. Y. McDonald Mfg. Co.
**Fort Dodge:** Pray, W. Dept.
**Iowa City:** Bartow, Dawson, Edwards, Hinman, Iowa Geological Survey, Kountz, Olin, Trygg, Waterman
**Keokuk:** Garrison
**Laurens:** Garner
**Madrid:** Webb
**Marion:** Toms
**Marshalltown:** Pedersen
**Mason City:** W. Dept.
**Muscatine:** Molis, City W.W., Stanley
**New Hampton:** Mau
**Oskaloosa:** Ellis
**Ottumwa:** Brown
**Perry:** Cole
**Sioux City:** Marzec, Sutherland
**Storm Lake:** Rix
**Waterloo:** Waterloo W.W.
**Woodward:** Godwin

## KANSAS

**Atchison:** Weatherford
**Chanute:** Williams
**Concordia:** Powell
**El Dorado:** McGahan
**Iola:** Klaumann
**Kansas City:** Collar, Donovan, Mangun, Rumsey
**Lawrence:** City W. Dept., Haney, Nunn, Treanor
**Leavenworth:** Johnson, Kansteiner
**Manhattan:** Van Blarcum
**Mission:** Senges
**Newton:** Souder
**Olathe:** Archer
**Oswego:** Morris
**Parsons:** Gilkison
**Pittsburg:** Rankin
**Salina:** Allison, Badley, Hopkins, W. Dept., Wilson, Wyatt
**Smolan:** Thomas
**Topeka:** Huffman, Pelton, Rupp, Staley
**Wichita:** City of Wichita, Millar
**Yates Center:** Sieker

## KENTUCKY

**Ashland:** Brownstead
**Bowling Green:** Hargett
**Camp Breckinridge:** Smith
**Camp Campbell:** King
**Carlisle:** Clay
**Covington:** Harris, Holman
**Danville:** Coldiron, Tuttle
**Glasgow:** Beatty
**Guthrie:** Dillery
**Harlan:** Munic. W.W.
**Harrodsburg:** Johnson
**Hopkinsville:** Boxley
**Lexington:** Bell, Cramer, Jacobson, Jernigan, Kentucky Utils. Co., Latham, Watkins
**Louisville:** Aker, Cantrell, Diehl Pump & Supply Co., Franz, Guyton, Handorf, Harris, Hopkin, Louisville W. Co., W. H. Lovejoy, W. O. Lovejoy, McGonigale, McLellan, Miller, Overstreet, Payne, Ranney W. Collector Corp., Rubber Reserve Co., State Bd. of Health, Stover, Vance, Vogt Mfg. Co., Young

**Madisonville:** Branson, McCoy, Ruby, Vannoy
**Mayfield:** Harrington
**Maysville:** Cochran, Hunsicker
**Midway:** Devers
**Morehead:** Rice
**Morganfield:** Tilford
**Owensboro:** Smith
**Paducah:** Mitchell, Paducah W.W., Wall
**Paris:** Baldwin
**Richmond:** Dougherty, Forbes
**Russellville:** Simmons
**Sebree:** Craig
**Winchester:** Attersall

## LOUISIANA

**Abbeville:** Herpin
**Alexandria:** Sloan, W. Dept.
**Bastrop:** Dunham, Porter
**Baton Rouge:** Connell, Edwards, Eldridge, Gulf States Utils. Co., Schwartz, Warner
**Bunkie:** Lacour
**Camp Claiborne:** Boriss
**Camp Livingston:** Wilson
**De Ridder:** Granberry, Montgomery
**Glenmore:** Blevins
**Gretna:** McCune
**Harvey:** Feitel
**Homer:** Walthall
**Jefferson Parish:** Boutall
**Kenner:** D'Gerolamo
**Metairie:** Camel, Hodgson
**Minden:** Garrett
**Monroe:** Cole
**New Orleans:** Bender, Earhart, Fowler, Gaspard, Grant, Haas, Hirsch, Moffat, O'Neill, Paterson, Smith, Wiley, Wood
**Pinesville:** Wells
**Port Sulphur:** Tuller
**Rayville:** Blakeman
**Shreveport:** Amiss, Boles, Reily
**West Monroe:** Fleming

## MAINE

**Augusta:** Anthony, Campbell
**Bangor:** Byron, Powell, Read
**Brunswick:** Brunswick & Topsham W. Dist.
**Houlton:** Houlton W. Co.
**Lewiston:** Laase
**Portland:** Burnie, Coburn, Fuller, Reny, West
**Rockland:** McAlary
**Sanford:** Clark
**Skowhegan:** Patterson, Wendell
**Waterville:** McKee
**Winthrop:** Tarr

## MARYLAND

**Aberdeen Proving Ground:** Burrill
**Annapolis:** Donaldson, Munroe
**Baltimore:** Bailey, Beavin, Black, Blackburn, Brown, Catanese, Coates, Cox, Edwards, Flack, Fletcher, Geyer, Goldsborough, Green, Hablik, Hall, Henthorn, Holland, Hopkins, Hudson, Kaltenbach, Kammer, J. B. Kauffman, W. S. Kauffman, Keefer, Kenney, Kinnear, Knapp, Lamley, LaMotte Chem. Products Co., Lenger, Levy, Lill, Linden, Machis, Myerly, Pepperman, Powell, Regester, Requardt, Rheem Mfg. Co., Ritter, Schamberger, Shepherd, Small, Strohmeyer, F. Stuart, Stuart-Brumley Corp., Warren, Weaver, Wheeden, Whitman, Wilson, Winslow, Wolman
**Bethesda:** Maier
**Brentwood:** Ortenzio
**Cambridge:** Chaney
**Chevy Chase:** Bird, Buck, O'Connor, Plummer, Tetzlaff, Weed
**Cumberland:** Celanese Corp. of America, Edwards
**Fort Geo. G. Meade:** Tawney
**Grasonville:** Kienle
**Hagerstown:** Ferguson
**Hyattsville:** DeVilbiss, Hall, Hechmer, Joyce, Shaw, Tomek, Washington Suburban San. Com.
**Laurel:** Caplan
**Luke:** Patrick
**Mt. Rainier:** Meissner
**Riverdale:** Owings
**Salisbury:** Gardner
**Savage:** Nichols
**Silver Spring:** Cary, Howe, Kunkel, Smith, Thomas, Wilbur
**Towson:** Stephens
**Westminster:** Day, Marson

## MASSACHUSETTS

**Andover:** Tate Pipe Linings Inc.
**Athol:** Stone
**Boston:** Barbour, Bond, Camp, Chase, Eddy, Ellis, Ellsworth, Fales, French, Gibbs, Halpin, Horne, Hydraulic Development Corp., Kennison, Marston, Ossolinski, Potter, Pratt, Red Hed Mfg. Co., Sampson, Shaw, Skinner, Sullivan, Sweeney, Weston
**Brockton:** Ryan
**Brookline:** Bushway, Houser, Robie
**Cambridge:** Fair, Good, Hanson, Moore, Stanley, Whipple
**Camp Edwards:** Pfreimer
**Cape Cod:** Horton
**Concord:** Robinson
**Dalton:** Dalton Fire Dist.
**Danvers:** Esty
**Fairhaven:** Long
**Foxboro:** Foxboro Co.
**Framingham:** Reed
**Great Barrington:** Ackerman
**Greenfield:** Field
**Haverhill:** Driscoll
**Hingham:** Streander
**Holyoke:** Tighe
**Indian Orchard:** Chapman Valve Mfg. Co.
**Leominster:** Classon
**Lowell:** Reynolds
**Malden:** Wentworth
**Medford:** Dwyer
**Methuen:** Mahoney
**Milford:** Milford Water Co.
**Millbury:** Symonds
**Milton:** Melley
**Newton:** Murray
**Newton Highlands:** Zack
**Newtonville:** Kinsel
**North Andover:** Duffy
**North Attleboro:** James A. Munroe & Sons
**North Beverly:** Knowlton
**Peabody:** Quirk
**Reading:** Taber
**Sandwich:** Chase
**South Boston:** Edson Corp., Hersey Mfg. Co.
**Southbridge:** Abbott
**Springfield:** Carlton, Deliso, Lochridge
**Taunton:** King
**Wakefield:** Lead Lined Iron Pipe Co.
**Winthrop:** E. M. Howard, P. F. Howard
**Worcester:** Gordon, Hardy, Hoy, Stephenson

## MICHIGAN

**Adrian:** Snedeker
**Algonac:** Merrill
**Almont:** Fenkell
**Ann Arbor:** Ann Arbor W. Dept., Ayres, Decker, Ellerbusch, Hoad, McNamee, Ridenour
**Battle Creek:** Damoose
**Bay City:** Harrison
**Bellevue:** Decker
**Benton Harbor:** Russell
**Birmingham:** Egbert, Lamb
**Cadillac:** Webb
**Caro:** Starkey
**Coldwater:** McQueen
**Dearborn:** Cooper, LaMarre, McCallion, McCarthy, Mullen, Parks, Payne, Shannon, Townsend
**Detroit:** Beatty, Burnett, Burroughs Adding Machine Co., Dalee, Dempster, Detroit Edison Co., Dow, Dubois, Dunham, Feben, Garrity, Gerardy, Gould, Green, Hirn, Hornshaw, Hubbell, Hulbert, Klang, Lenhardt, Liddle, McBride, Meyer, Michael, Moffat, Morrill, Morrow, Ouellette, Powers, Rindelhardt, Roden, Saunders, H. F. Smith, W. E. Smith, Soffe, Stewart, Wallace, Watson, Wayne Co. Bd. of Road Comrs., Wright
**Durand:** Reynolds
**East Lansing:** Mallmann
**Ecorse:** City of Ecorse
**Escanaba:** Escanaba Munic. Utils.
**Flint:** Flint W. Dept., Musser
**Grand Haven:** Ellis
**Grand Rapids:** Grand Rapids W. Dept., Harris, Mace
**Grosse Pointe Farms:** DeBoer
**Hamtramck:** W. Dept.
**Harbor Beach:** Ritchie
**Hastings:** Laberteaux
**Hazel Park:** Neusius
**Highland Park:** Dahljelm, Golden

**Hillsdale:** Clark
**Holland:** Vos
**Iron Mountain:** Rubbo
**Jackson:** Cattell
**Kalamazoo:** Libby, McClane, Norman, Norton
**L'Anse:** Georgeff
**Lansing:** Bd. of W. & Elec. Lt., Clark, Dye, Faust, Hepler, McGuire, Miller, Mills, Muhlitner, Pirie, Rich
**Marine City:** Hazey
**Marquette:** Cliffs Dow Chem. Co., Rowley, Sloan
**Marysville:** W. Dept.
**Melvindale:** MacDonald
**Midland:** Midland W. Dept.
**Monroe:** Jennings, Reighard
**Mt. Clemens:** Keils
**Muskegon:** Cihak, Sensabaugh
**Muskegon Heights:** Matthews
**Niles:** Kuester, Parnell
**Owosso:** W. Dept.
**Pentwater:** Williams
**Pontiac:** Buchanan, MacDuff, Oberlin
**Port Huron:** Mueller Brass Co.
**Portland:** Grantham
**River Rouge:** Moore
**Rogers City:** Garratt
**Royal Oak:** Landgraf
**Saginaw:** Eckert, Francis, Richardson
**St. Clair:** Baumann, City of St. Clair
**St. Clair Shores:** Swartz
**St. Louis:** Housel
**South Haven:** Smith
**Tawas City:** Myles
**Traverse City:** Eikey, Traverse City Iron Works
**Van Dyke:** Ruehle
**Wayne:** Kallin
**Wyandotte:** Allen, Potts
**Ypsilanti:** W. Dept.

## MINNESOTA

**Albert Lea:** W. Dept.
**Alexandria:** Wedum
**Aurora:** W. & Lt. Dept.
**Austin:** Bd. of W. Elec. Gas & Power Com.
**Brainerd:** Zapffe
**Cloquet:** Campbell, Noreus
**Duluth:** Cutler-Magner Co., Foster, Tischer
**East Grand Forks:** Powers
**Ely:** Buccowich
**Eveleth:** City of Eveleth, Stauff
**Fairmont:** Basom
**Faribault:** Wilson
**Fergus Falls:** W. & Lt. Dept.
**Grand Rapids:** Hanson
**Granite Falls:** Barager
**Hallock:** Jensen
**Hastings:** Wimer
**Hibbing:** Forsberg, W. Lt. Power & Bldg. Com.
**International Falls:** Boes
**Keewatin:** Boudreau
**Little Falls:** McPherson
**Mankato:** Kircher
**Minneapolis:** Bach, Bell, Brownell, Dixon, Estabrook, Finch, Fire Underwriters Inspection Bur., Flox Co. Inc., Gross, Janzig, Jensen, Johnson, Jones, Kirk, Larson, Lundquist, Mellen, Minneapolis Com. of W.W., National Soap & Chem. Co., Paulson, Poole, Raab, Robbins, Rogers, Seemann, Simcoe, Sowden, Stock, Taylor, Thompsen, Wagner, Wangaard, Whittaker
**New Ulm:** Ulrich
**Ortonville:** Kriesel
**Owatonna:** Owatonna Munic. Pub. Utils.
**Red Wing:** Bd. of W. Comrs.
**Rochester:** Kingston, Schwarz
**St. Cloud:** Seibert
**St. James:** Church
**St. Paul:** Bd. of W. Comrs., Duvall, Findlan, Flanagan, Gold, Grime, Edward E. Johnson Inc., Keys Well Drilling Co., Lewis, McCarthy Well Co., McPeak, Morris, Mueller, Rosen, Schroepfer, Shepard, Thompson, Thuma, Waterous Co.
**Staples:** Klang
**Stillwater:** Grove
**Two Harbors:** City of Two Harbors
**Winona:** Bd. of Munic. Works

## MISSISSIPPI

**Amory:** Miller
**Camp McCain:** Straughn
**Canton:** Canton Munic. Utils.
**Greenwood:** Stott
**Jackson:** Kroeze, Lester, Wade
**Meridian:** Pinkston, Shephard
**Natchez:** Babit, Stewart
**Tupelo:** Trout
**Vicksburg:** Ward
**Yazoo City:** Middleton

## MISSOURI

**Boonville:** Hagar, Sanders
**Carthage:** Williams
**Chesterfield:** Graf, O'Gorman, Schworm
**Chillicothe:** Chillicothe Munic. Utils.
**Clayton:** Glenn
**Columbia:** Crane, Luebbers, Wolcott
**Hannibal:** Higgins, Watson
**Harrisonville:** Brown
**Hickman Mills:** Barry
**Higginsville:** Hebbler
**Independence:** Bliss, Carl, Remington Arms Co. Inc.
**Jefferson City:** Helmreich, Kramer, Johnson
**Joplin:** Wymore
**Kansas City:** Archer, E. W. Bacharach & Co., Baldwin, Barada & Page Inc., Baum, Black, Collar, Crocker, Dodd, Farmer, Filby, Fitzpatrick, Foreman, Fuller, George, Haskins, Hatcher, Herrmann, Hopkins, Ivy, Jacobson, Joslyn, Keefer, Kincaid, King, Learned, Mathews, McDonnell, Mullergren, Myers, Parker, Patterson, L. C. Pensinger & Son, Reynolds, Samuel Jr., Samuel III, Senevey, Shockley, C. A. Smith, L. A. Smith, Strang, Svenson, Timanus, Veatch, W. Dept., Wolfe
**Kirkwood:** Theiss
**Lexington:** Prewitt
**Liberty:** Barnes, Brouillette
**Louisiana:** Haley
**Neosho:** Propst
**Overland:** Hetzer
**Poplar Bluff:** Lamar
**Raytown:** Jones
**St. Charles:** Oelklaus
**St. Joseph:** McAndrew, Smouse
**St. Louis:** Am. Fdry. & Mfg. Co., Anheuser-Busch Inc., Bauman, Bremerman, Case, Dean, Easterday, Graves, Hartung, Hawken, Henning, Holaday, Jens, Jutz, Keller, Leaver, Lischer, Margolis, Martin, McFarland, Meyer, Monsanto Chem. Co., Pritchard, Rimbach, Skinker, Waring, Wenger
**Sedalia:** Reed
**Springfield:** Everett, Piner
**Trenton:** Ralls
**University City:** Weir
**Warrensburg:** Christopher
**Webb City:** Newell

## MONTANA

**Anaconda:** Anaconda Copper Mining Co., Grush
**Big Timber:** Walvoord
**Billings:** Baker, Beiswanger, Christensen, Dixon, Downs, Heath, Hewett
**Bozeman:** City of Bozeman, Cobleigh, Quinnell
**Butte:** Carroll, Hazen, Plummer
**Chinook:** Brandis
**Columbus:** Marcott
**Deer Lodge:** Gerstacker
**Denton:** Schrader
**Dillon:** Leubben, Patrick
**East Helena:** City of East Helena
**Forsyth:** Palmer
**Fort Shaw:** Hall
**Gardiner:** Lauer
**Glendive:** Eyer
**Great Falls:** Chamberlin, City of Great Falls, Killgreen, Millensifer, Moore, Richardson, Thomas, Voden, Wells, Wenzel
**Hamilton:** Thane
**Hardin:** Young
**Harlem:** Parks
**Havre:** City of Havre W. Dept., Pearce
**Helena:** Brinck, Foote, Garber, W. Dept.
**Lewistown:** Schmit
**Livingston:** Cortese
**Miles City:** Cory, Regan, Wiel
**Missoula:** McCann
**Sidney:** Mercer
**Superior:** Horning

## NEBRASKA

**Fremont:** Henry
**Grand Island:** Burdick
**Hastings:** Bd. of Pub. Works
**Kearney:** Lancaster
**Lincoln:** City W. & Lt. Dept., Erickson, Filipi
**McCook:** Erickson
**Omaha:** Barber, Barklage, Bunnell, Byrne, Detweiler, Holdrege, Lasell, Metropolitan Utils. Dist., Refinite Corp., Ryan, Van Dusen
**Plattsmouth:** Pollock
**Sidney:** Jones
**York:** Malster

## NEVADA

**Boulder City:** O'Neill
**Las Vegas:** Doll
**Reno:** Sierra Pacific Power Co., White
**Virginia City:** Leonard

## NEW HAMPSHIRE

**Berlin:** Tankard
**Concord:** Howard
**Laconia:** Payne Dean & Co.
**Manchester:** Shaw
**Nashua:** Pennichuck W.W.

## NEW JERSEY

**Allendale:** W. Dept. of Boro of Allendale
**Allenhurst:** McCarthy
**Alpha:** Borough of Alpha
**Arlington:** City of Bayonne W. Dept.
**Atlantic City:** Brunstein, Grossman, Van Gilder
**Belleville:** Glass, Marks
**Beverly:** Horan
**Bloomfield:** Clement, Town of Bloomfield
**Bogato:** Brinkerhoff
**Boonton:** Mallalieu, Mara
**Bound Brook:** Brush, Kupper
**Bridgeton:** King
**Brielle:** Voorhees
**Burlington:** Conard, Hoffer, Russell, Shinn, Stokes, Zelley
**Camden:** Bowman, Connor, Lewis, Pub. Works Dept., Rodan, Sheehan, Sleeper
**Cedar Grove:** Black, Plunkett
**Clayton:** Hungerford
**Cliffside Park:** Walasyk
**Clifton:** Childs, Connelly, Fitzgerald
**Collingswood:** Collings, Harris
**Denville:** Lee
**Dover:** Dover W. Comrs.
**Dunellen:** Mann
**East Orange:** Apgar, Bd. of W. Comrs., Brainard, Cadmus, Godet, Klein, Lock Joint Pipe Co., Longley, N.J. State Water Policy Com., O'Brien, Roper, Roux, A. P. Smith Mfg. Co., Vermeule
**Edgewater:** Ockershausen
**Egg Harbor City:** McCann
**Elizabeth:** Biddle, Crane, Germann, McGrath, Newkirk, Radcliffe, Schaefer, Stone, Ward
**Englewood:** Talbot
**Essex Fells:** Bell, Tiernan
**Fair Haven:** Travis
**Fairlawn:** Harley, Knapp
**Flemington:** Stothoff
**Florence:** Green
**Franklin:** Jenkins
**Freehold:** McGowan, Schiverea
**Garfield:** McAlpine
**Glen Ridge:** Flentje, Glen Ridge W. Dept., Wilson
**Glen Rock:** Rinbrand Well Drilling Co. Inc.
**Hackensack:** Frank, Menzenhauer, Weir
**Haddon Heights:** N.J. W. Co.
**Haddonfield:** Ford, Borough W. Dept.
**Haledon:** Kapp, Miller
**Hammonton:** Lobley
**Harrison:** Hall, Tintle, Worthington Pump & Machinery Corp.
**Harvey Cedars:** Borough of Harvey Cedars
**Hawthorne:** Fairhurst, Frazza
**Highland Park:** Smalley
**Jersey City:** Hoy, Jewell, Joseph Dixon Crucible Co., Limestone Products Corp. of Am., Ohland
**Kearny:** Brokaw
**Keyport:** Brower
**Linden:** Hodgin
**Little Falls:** Currens, Teece
**Livingston:** Burack, Livingston W. Dept.
**Lodi:** De Boise, Sepede
**Long Branch:** Herr
**Lyndhurst:** Muhleisen
**Manasquan:** Thompson, Van Brunt
**Manville:** Barbehenn, Colton, Krassy
**Maplewood:** Faulks, Gatley
**Matawan:** Heuser
**Medford:** Wagner
**Merchantville:** Campbell, Corson, South Jersey Assn. of W. Supts.
**Milford:** Milford W. Dept.
**Millville:** Melvin, Wade
**Montclair:** Bourgin, Cole, Germond, Ross, Shedden, Weaver
**Montvale:** Gray
**Moorestown:** Ellis, Greenwood
**Morristown:** Butera, Toms
**Mount Holly:** Mount Holly W. Co.
**Mountain View:** Cassidy
**Neptune City:** McQuilkin
**New Brunswick:** Atkinson, Baker, End, Lendall, Rudolfs
**New Milford:** Cady, Cowles, Spalding, Tamer
**Newark:** Banks, Browning, Chamberlin, Cochrane, Coles, Eastwood, Ell, Ferguson, S. F. Ferguson, Flanders, Garratt, Hutton, Matte, Merckel, Murray, Orchard, D. S. Plumb Co. Inc., Potter, Quigley, Robbins, Runyon, Schwartz, Tygert, Wallace & Tiernan Co. Inc., Worthington-Gamon Meter Co.
**North Caldwell:** Bickley
**Nutley:** Town of Nutley W. Dept.
**Oakland:** Pulis
**Ocean City:** Steelman
**Ogdensburg:** Chorney
**Oradell:** Pallo
**Orange:** Caspar, McNamara
**Palmyra:** Greco, Reinicker, Tyler
**Park Ridge:** Smith
**Passaic:** Feinberg, Ryle
**Paterson:** Bentley, Bonyun, Cook, Deighton, MacGregor, Ogden, Secker, Spitz
**Peapack:** Sprague
**Perth Amboy:** Reager, Roe
**Phillipsburg:** Thomas
**Pitman:** Bryan
**Plainfield:** Gavett, Winslow
**Pompton Lakes:** Wood
**Pompton Plains:** Edwards, Griffin
**Princeton:** Hutchinson, Riker
**Rahway:** Eller, Gibbons
**Ramsey:** Ramsey W.W.
**Raritan:** Miller
**Red Bank:** Cadman, Hotchkiss, White
**Ridgewood:** Bauman, Carr
**Riveredge:** Roby
**Rochelle Park:** Belli, Every
**Rockaway:** Borough of Rockaway W. Dept.
**Roselle:** Williams
**Rutherford:** Kozma
**Salem:** W. Dept.
**Sea Girt:** Cornelius
**Sea Isle City:** Mazurie
**Somerville:** Craig, Potter
**South Amboy:** National Lead Co.
**South Orange:** Scott
**Sparta:** Callahan
**Summit:** Bassett, Coleman
**Teterboro:** Purcell
**Toms River:** Snyder
**Trenton:** Brooks, Bugbee, Critchlow, Croft, De Laval Steam Turbine Co., Greenfield, Hanks, Johnson, Kowalchik, Kroschwitz, Morris, Shaw, Trenton W.W.
**Upper Montclair:** Baker
**Verona:** Carmichael
**Vineland:** Borough of Vineland W. Dept.
**Wanaque:** Bradshaw, Capen, McDonough, Pomfret, Purcell, Ryan, Wilensky
**Weehawken:** Alfke, Damiano, Fricker, Schlicht, Von Scheidt, Zerman, Zoeller
**West Englewood:** Wieghardt
**West New York:** Boquist
**West Orange:** Fritz
**Westfield:** Clark, Haskew, Wailes Dove-Hermiston Corp.
**Westwood:** Seeholzer
**Wharton:** Bd. of Pub. Works
**Woodbridge:** Mundy

## NEW MEXICO

**Albuquerque:** City of Albuquerque, Howard
**Carlsbad:** McMinn, Roberts
**Deming:** Deming W. Dept.
**Las Vegas:** N.M. Power Co.—Agua Pura Div.
**Raton:** Riddell
**Santa Fe:** N.M. Power Co., N.M. Pub. Serv. Com., Poston
**Silver City:** W. Dept.
**Taos:** Martinez

## NEW YORK

**Albany:** Austin, Cox, Dapper, Erickson, Gilcreas, Holmquist, Sheldon, Smith, Suter, Thompson, Tripp, Wheeler
**Albion:** W. Dept.
**Amsterdam:** Taggart
**Andover:** Boyd
**Ashokan:** Friedman
**Auburn:** Auburn W. Dept.
**Avon:** Clark
**Babylon:** Five, Zele
**Ballston Spa:** W. Dept.
**Batavia:** City of Batavia, Cook
**Bay Shore:** Fenn
**Bayside:** Henderson
**Binghamton:** Bur. of W., Costello
**Brockport:** Glynn, Smith
**Bronxville:** Cleverdon
**Buffalo:** C. K. Bassett, G. B. Bassett, Bates, Bingham & Taylor Corp., Buffalo Meter Co., Buffalo Niagara Elec. Corp., Creager, Davis, Dewey, Div. of W., Drake, Dye, Fahning, Fitzgerald, Friedman, Grotz, Huy, Kurtz, Nussbaumer, Randorf, Sterling Engine Co., Thomas, Wagner
**Caledonia:** Fitz-Gibbons
**Canajoharie:** Bullock
**Canandaigua:** Ellis
**Canastota:** W. Dept.
**Catskill:** Hagginbothom
**Chappaqua:** Page
**Chateaugay:** Chateaugay W.W. Co.
**Cherry Valley:** Pegg
**Cobleskill:** Dyer, Shafer
**Corning:** Drake, W. Dept.
**Cortland:** Ford
**Coxsackie:** Am. Valve & Mfg. Co.
**Delmar:** Hall, McHugh
**Dunkirk:** Bd. of W. Comrs.
**East Aurora:** Shed, Village of East Aurora
**Elizabethtown:** Hubbard
**Elmhurst:** Citizens W. Supply Co. of Newtown
**Elmira:** Elmira W. Bd., Kennedy Valve Mfg. Co.
**Elsmere:** Peck
**Endicott:** Endicott W.W. Co.
**Fairport:** Sullivan
**Fishers Island:** Fishers Island Farms Inc.
**Floral Park:** Rau
**Flushing:** Enslow
**Frankfort:** Shea
**Franklin Square:** Franklin Square W. Com.
**Fredonia:** Cranston, Heubi
**Freeport:** Maurer, Southard
**Garden City:** Inc. Village of Garden City
**Geneseo:** Geneseo W.W.
**Glen Cove:** Ogden
**Glen Head:** Tappen
**Glens Falls:** Glens Falls Bd. of W. Comrs.
**Gloversville:** Gloversville W.W., Vrooman
**Gouveneur:** Miller
**Governors Island:** Culley
**Great Neck:** Pelkus
**Greenport:** W. Dept.
**Greenwich:** Patten
**Hamburg:** Roberts, Sterns
**Hamilton:** Albrecht
**Hempstead:** Inc. Village of Hempstead, Williamson
**Herkimer:** Bachelder
**Hicksville:** Hicksville W. Dist.
**Highland:** Marx
**Holland:** Holland W. Dist. No. 1
**Hornell:** Gorman
**Hudson:** Dept. of Pub. Works, Town of Greenport W. Dist. No. 1
**Ilion:** Bd. of W. Comrs.
**Irvington:** W. Dept.
**Ithaca:** Carpenter, Georgia, Gifft, Goldman, Malcolm, Mangones, Seery, Walker
**Jamaica:** Brashears, Keily, Lamb, Ley, Marquardt
**Jamestown:** Bd. of Pub. Utils., Bernhardt, Johnson
**Johnson City:** Johnson City W. Dept.
**Katonah:** Hickok
**Kenmore:** Town of Tonawanda
**Kinderhook:** W. System
**Kingston:** Darrow, Muddiman
**Lake Placid:** Hare
**Lancaster:** Huber
**Larchmont:** Hotchkiss
**Le Roy:** O'Mealia
**Liberty:** Liberty W.W.
**Little Falls:** Austin
**Little Valley:** Underwood
**Lockport:** Foltz, Hooker
**Lowville:** Adirondack W.W.
**Lynbrook:** Farley, Rowley, Stearns
**Malone:** Van Deusen
**Mamaroneck:** Thrasher
**Manhasset:** Manhasset-Lakeville W. Dist.
**Massapequa:** Bornemann
**Mechanicville:** Sage
**Middletown:** Abt, Bull, Meara, Steitz
**Mineola:** Nassau Co. Dept. of Health, Village of Mineola Inc.
**Mohawk:** Martin
**Monticello:** Divine
**Mount Kisco:** Mathews
**Mount Morris:** W. Dept.
**Mount Vernon:** Jewell, Manahan, Scott, Theobald
**Munnsville:** Ackerman
**New Hyde Park:** Gebhardt
**New Rochelle:** Cranch, Gooding, New Rochelle W. Co.

### New York City

**Bronx:** Chanlett, Eliassen, Johnson, Nuebling, Reichman, Riddick, Saville, Velz, Whitley
**Brooklyn:** Aeryns, Arno, Barnett, Hale, Heller, Horandt, Nesin, Niedrich, National Meter Div., Joseph G. Pollard Co. Inc., Romer, Taylor
**Manhattan:** Abrams, Allen, Ambursen Eng. Corp., Am. City Magazine, Am. Cyanamid & Chem. Corp., Am. Iron & Steel Inst., Am. Smelting & Refining Co., Am. W.W. & Elec. Co. Inc., Applebaum, Arenander, P. S. Armstrong, R. W. Armstrong
Bachmann, Baffa, L. A. Baldwin, R. T. Baldwin, Barnhill, Barr, barrett Div., Becker, Bennett, Berry, Biggs, Blanchard, Blum, Bock, Bogert, Bonsib, Booth, Bowe, Bowers, Boyd, Brown, Brush
Cambridge, Case, Central Fdry. Co., Centriline Corp., Chamberlain, C. M. Chenery, C. T. Chenery, Cole, Chevalier, Clark, Community W. Serv. Co., Copper & Brass Research Assn., Crane
Darco Corp., Dennett, Dixon, Donaldson, Dong, Dorr Co.
Ebasco Services Inc., Emerson, Eng. News-Record
Faber, Federal Advisers Inc., Ford, Foster, Foulds, Freeman
Gausmann, Geisler
Haiss, Hazen, Helbig, Henderson, Hess, Hoag, Hochlerner, Hogan, Hollander, Hopper
Indus. Chem. Sales Div., Inglee
Jacobs, Jagger, Johns-Manville Sales Corp, Johnson, Jones, Jost
Kendall, Kent, Killam, Klett Mfg. Co., Knoener, Krell, Kriegsheim
Lang, Lead Industries Assn., Luce
Mann, Marsh, Mathieson Alkali Works Inc., Mazac, Meyerherm, Miller, Murdoch
National Automatic Sprinkler Assn., National Council for Stream Improvement of Paper, Pulp & Paperboard Industries, National Water Main Cleaning Co., Nelson, Neptune Meter Co., Niagara Alkali Co., Nice, Norcom, Nordell, Northrop
Oberholtz, Ornstein, Overholt
Palmer, Patton, Peloso, Permutit Co., Pincus, Pirnie, Pitometer Co., Place, Pohl, Potts, Preload Co., Pub. Works, Purdy
Quigley Co. Inc., Quilty
Rankin, Revere Copper & Brass Inc., Ribner, Rice, Ruberoid Co.
L. A. Salomon & Bro., Sanborn, Saunders, Sawyer, Scharff, Scott, Seabury, Seifert, Shuldener, Sigworth, Sinclair, Solvay Sales Corp., Stevens, Stevenson, Stewart, Straub, Symons
Thomson Meter Co., Trowbridge, Turner
Wafer, Wagner, Walker, Warren Fdry. & Pipe Corp., W.W. Eng., Whitlock, Wiggin, Wolff, Wrench, Wyckoff, Zadigan

**Queens:** Diven, Grodin, Interstate Lead Corp., Kydd, Rihm, Ritchie, Sax
**Richmond:** Phoenix Meter Corp., Warde
**Newark:** Wright
**Niagara Falls:** Burdick, Dignan, Hooker Electrochem. Co., Piper
**North Creek:** North Creek W. Dist.
**North Tarrytown:** Kassay
**North Tonawanda:** Oelkers
**Nyack:** Perry
**Ogdensburg:** Lord
**Olean:** Olean W. Dept.
**Oneida:** Clark, Sherrill-Kenwood W. Com.
**Oneonta:** Rickard, Rock, Watkins
**Ossining:** Bd. of W. Comrs.
**Oswego:** Dept. of W., Herron, McCaffrey
**Owego:** Owego W.W.
**Peekskill:** Wood
**Pelham:** Kroeber
**Plattsburg:** City of Plattsburg
**Pleasantville:** Day
**Port Chester:** Homelite Corp., Kaufman
**Port Jervis:** Sheldon
**Port Washington:** Jordan
**Poughkeepsie:** Bd. of Pub. Works, Cole, Dean, Gard, Kiker, Rhynus, Walker
**Rensselaer:** Claflin
**Riverhead:** Benjamin
**Rochester:** Crosier, Edwards, Gordon, Gray, Howe, Lewis, Little, Lozier, Moore, Morrison, Mussi, N.Y. State Conservation Dept., Price, Russell, Shnidman, L. B. Smith, M. Smith, Squire, Town of Greece W. Dept., Wagener
**Rockville Centre:** Patten
**Rome:** Rome Bur. of W.
**Roslyn:** Ketcham
**Rouses Point:** Village of Rouses Point
**Rye:** Aldrich
**Salamanca:** Weagraff
**Scarsdale:** Conlan, Newsom
**Schenectady:** City of Schenectady, Devendorf, Taylor
**Sea Cliff:** Ketcham
**Seneca Falls:** Seneca Falls W. Dept.
**Sherburne:** Champ
**Silver Creek:** Silver Creek W.W.
**Skaneateles:** Horsington
**Snyder:** Gibney
**Sodus Point:** Comstock
**Somerville:** Ferguson
**South Ozone Park:** Sleeper, Stankewich
**Spring Valley:** Gutteridge
**Suffern:** deWaard
**Sylvan Beach:** Freiberger
**Syracuse:** Barrows, Kelly, Korves, Mitchell, O'Brien, Syracuse Dept. of Eng., Thompson, Wagenhals, West
**Tarrytown:** Losee
**Thornwood:** Jiannott
**Tonawanda:** Korff, Siegmund
**Troy:** Bischoff, Bur. of W., Caird, Clifton, End, Gurley, Holroyd, Keis, Kilcawley, Knickerbacker, Ludlow Valve Mfg. Co., Parkhurst, Rensselaer Valve Co., Ross Valve Mfg. Co. Inc.
**Tupper Lake:** Tupper Lake Munic. W. System
**Union:** Ware
**Utica:** Griswold, Haberer, Hopkins, Mattinson, Miles
**Valhalla:** Havill, Kelley
**Vestal:** Murphy
**Voorheesville:** Horton
**Waterford:** Eddy Valve Co., Yaxley
**Watertown:** Field, Jennings, Tyldesley
**Watkins Glen:** Haughey
**Waverly:** Hall, W. Dept.
**Webster:** Hawley, O'Dell, Pinkney
**Wellsville:** Rowe
**Westbury:** Westbury W. Dist.
**Westfield:** Howson
**White Plains:** Friese, Harding, Russo, Scholz, Velzy, Westchester Co. Dept. of Health, White Plains Dept. of Pub. Works, Wood
**Willard:** Russell
**Williston Park:** Inc. Village of Williston Park
**Yonkers:** Carroll

## NORTH CAROLINA

**Albemarle:** Moore
**Asheboro:** Adkins, Yow
**Asheville:** City of Asheville, Ives
**Badin:** Carolina Aluminum Co.
**Belmont:** Hovis, Richey
**Burlington:** Thomas
**Camp Butner:** Walsh
**Camp MacKall:** Gutierrez
**Canton:** Seaman
**Carolina Beach:** Town of Carolina Beach
**Chapel Hill:** Baity, Hopper, Saunders, Univ. of N.C.
**Charlotte:** Clapp, Cordle, Davidson, Davis, Dickson, Doane, Franklin, Glace, Greenlee, Grinnell Co. Inc., Harding, Heyward, Le Clerc, Lee, Potter, Purser, Rawlins, Starling, Vest, Wooten
**Concord:** Bd. of Lt. & W. Comrs., Brown, Fisher
**Cramerton:** Young
**Creedmore:** Town of Creedmore
**Dunn:** Town of Dunn
**Durham:** Alexander, Brown, Christie, Davis, Dement, Durham W. Dept., Earp, Hall, Lubow, Malone, Moggio, Moses, Phillips, Piatt, Redding
**Elizabeth City:** Luther, Parker
**Enka:** Am. Enka Corp.
**Forest City:** Forest City W.W.
**Fort Bragg:** Mutzberg
**Gastonia:** City of Gastonia
**Goldsboro:** City of Goldsboro
**Granite Falls:** Robinson
**Greensboro:** Flanagan, Gregory, Proximity Mfg. Co., True, W. Dept.
**Greenville:** Swartz
**Hamlet:** Stowe
**Hemp:** Hemp W. Dept.
**Henderson:** Henderson W.W.
**Hendersonville:** Lampley
**Hickory:** City of Hickory, Setzer
**High Point:** Du Bruyne, Perkins
**Hillsboro:** Hillsboro W. Dept.
**Holly Ridge:** Berry
**Kannapolis:** Cannon Mills Co.
**Kinston:** Weyher
**Kure Beach:** Kure Beach W.W.
**Laurinberg:** Kuttler
**Leaksville:** Smith
**Lenoir:** Lenoir W. Dept.
**Lincolnton:** Randall
**Lumberton:** McNeill
**Manchester:** Blalock
**Manteo:** Cannady
**Mebane:** Michael
**Monroe:** City of Monroe
**Mooresville:** Hall
**Morganton:** Kearney
**Mount Airy:** Town of Mount Airy
**Mount Holly:** Munic. W. Dept.
**Murphy:** Johnson
**Newton:** Pope
**Overhills:** Spence
**Pinehurst:** Pinehurst Inc.
**Pisgah Forest:** Ecusta Paper Corp.
**Raeford:** McMillan
**Raleigh:** Burchard, Coleman, Doggett, Grady, Hill, Hubbard, Jarrett, Kellogg, Kin, LaMar, Olsen, Peirson, Stiemke, Swab, W. Dept., Westbrook
**Randleman:** City of Randleman
**Reidsville:** Bugher
**Richland:** Page
**Roanoke Rapids:** Lancaster
**Rockingham:** Tull
**Rocky Mount:** Smith
**Rutherfordton:** Anderson
**Salisbury:** English, Lesslie
**Sanford:** Wicker
**Shelby:** Toms
**Siler City:** Town of Siler City
**Southern Pines:** Mills, Van Camp
**Statesville:** City W. Dept., Hughey
**Swannanoa:** Shore
**Tarboro:** Bryan, Martin
**Thomasville:** Witty
**Valdese:** Valdese W.W.
**Wadesboro:** Ratliffe
**Wake Forest:** Town of Wake Forest
**Weldon:** Weldon W.W.
**Williamston:** Manning
**Wilmington:** Lassiter, Maffitt
**Wilson:** Wilson W.W.
**Winston-Salem:** Ebert
**Zebulon:** Thompson

## NORTH DAKOTA

**Bismarck:** Clark, Lauster, MacDonald, Svore, Yegen
**Fargo:** Ayliffe, Behlmer, Lobb, Tarbell

**Grand Forks:** Hulteng, Jenson
**Jamestown:** Stephenson
**Minot:** Bavone
**New England:** Sleight

## OHIO

**Akron:** Barstow, Davis, Elting, Firestone Tire & Rubber Co., Glick, Goodman, B. F. Goodrich Co., Hardware & Supply Co., Hoffman, LaDue, Paul, Rhoades, Sherbondy, Thomas
**Alliance:** Heffelfinger, Stanley
**Ansonia:** Deeter
**Apco:** Hauck
**Ashtabula:** Gullo
**Aurora:** Switzer
**Avon Lake:** Britton
**Baltimore:** Orr
**Barberton:** Babcock & Wilcox Co., Claggett, Columbia Chem. Div., Rollins, Snyder
**Batavia:** Stouder
**Belle Center:** Stout
**Bowling Green:** Case, Maglott
**Brewster:** Edwards
**Bryan:** Miller
**Bucyrus:** Lower, Riley
**Canton:** Peerless Pump Div., Ransom, Schlott
**Centerville:** Fox
**Chillicothe:** Hibbs, Mead Corp.
**Cincinnati:** Becker, Bourbon Copper & Brass Works Co., Bready, Bruck, Chenal, Duhme, Eberling, Enright, Entwhistle, Evans, Gaudin, Gedge, Grier, Hoffman, Irwin, Keinath, Le Bosquet, Mace, Middleton, Nutting, H. C. Nutting Testing Engrs., Reeves, Rimmer, Sahnd, Streeter, Trout, Weber, Wylam
**Cleveland:** Antweiler, Barnes, Braidech, Crown, Danner, Elec. Chem. Co., Ellms, Farnan Brass Works Co., Faye, Fischer, Hamlin, Fred W. Hanks Co., Harlamert, Havens, Hiatt, Hickey, Hill Hubbell & Co. Div., Horlacher, Jones, Koyl, Kroone, Levy, Lewis, MacDowell, MacLachlan, Marsh, Marshall, Moses, Novasel, Pease, Republic Steel Corp., Rush, Rusta Restor Div., Sangdahl, Schramm, Simmermacher, L. P. Smith, R. B. Smith, Statham, Tolles, Young
**Cleveland Heights:** Barton, Siebold
**Columbus:** Albert, Blaik, Bonham, Bull, Burgess, Cornell, Crane, Driskell, Dye, Foulk, Fuller, Herndon, Hill, C. B. Hoover, C. P. Hoover, Hoyt, Jeffrey Mfg. Co., Jones, Knox, Krumm, Lathrop, Luchtenberg, Martin, Matson, McIntyre, Mendelsohn, Nicklis, Powers, Prior, Riehl, Scott, Shenker, Shotts, Solleder, Stewart, Stilson, Walker, Waring, Water Leak Detector Co.
**Conneaut:** Green, Kantola
**Cuyahoga Falls:** Ewart
**Dayton:** Buck, Costello, Electro Rust-Proofing Co., Flotron, Kochendorfer, Morehouse, Parrish, Reemelin
**Defiance:** Campion
**Delaware:** Cross, Irwin
**East Cleveland:** Barnes
**East Liverpool:** Larkins
**Findlay:** Foltz
**Fremont:** Schneider
**Girard:** Reep
**Greenwich:** Marsh
**Hamilton:** Farr, Kautz
**Hubbard:** Jackson
**Ironton:** Edwards
**Ivorydale:** Schulze
**Jackson:** Brunton
**Kent:** Gettrust, Hostettler, Young
**Killbuck:** Kuhns
**Lakeside:** Webber
**Lancaster:** Graf
**Leroy:** Decker
**Lima:** Smith, Stimmel
**Lodi:** Eakin
**Lorain:** Humason
**Mansfield:** Hauserman, Kalbfleisch
**Marion:** Browne, Gaither, Pierce, Whysall
**Martins Ferry:** Jenkins
**Marysville:** Banks
**Massillon:** Ulrich
**Medina:** Wilder
**Mentor:** Babcock
**Middletown:** Am. Rolling Mill Co., Barnard, Gebhart
**Milford:** D. R. Erion, R. Erion
**Montpelier:** Hoover
**Napoleon:** Adams, Kelley
**Newark:** Price
**Norwood:** Reed
**Oak Harbor:** Zorn
**Orrville:** Specht
**Painesville:** Cook, Fitch
**Pemberville:** Wiegman
**Perrysburg:** Ames
**Piqua:** Hickey
**Plymouth:** Crawford
**Rittman:** Milford
**Rossford:** Libbey-Owens-Ford Glass Co.
**St. Clairsville:** Hardesty
**Sandusky:** Grathwol, Schoepfle
**Steubenville:** Trainer
**Struthers:** Carty, Evans, Sharpe
**Toledo:** Applegate, O. E. Clark, W. G. Clark, Finkbeiner, Foster, Furman, Henry, Jones, Kruger, Reed, Schoonmaker, Singer, Stepleton, Winsinger
**Toronto:** Thompson
**Troy:** Heaton, Ruck
**Warren:** Hapgood, O'Connor
**Wellsville:** Tarr
**West Milton:** Farver
**Westerville:** Wenger
**Williamsburg:** White
**Wilmington:** Druley
**Wooster:** Fox
**Worthington:** Caster, Taladay
**Youngstown:** Fawcett, Robinson, Russell, Smith, Van Arnum, Youngstown Sheet & Tube Co.
**Zanesville:** Kenily, Ross

## OKLAHOMA

**Bartlesville:** Burnham, Taylor
**Clinton:** A. J. Carver, L. A. Carver
**Durant:** Clack
**El Reno:** Hromada
**Foss:** Williams
**Guthrie:** Barry
**McAlester:** Collins
**Muskogee:** Anderson
**Okemah:** Harding
**Oklahoma City:** Abernathy, Bretz, Cunningham, Darcey, Herrmann, Nash, Robertson, Schouten, Sherman Machine & Iron Works, Taylor
**Stillwater:** Behrendt, Harris, Smith, Stapley
**Tulsa:** Cecil, Duncan, Holway, Maher, McMurry, Shelton, Shurtleff, W. Dept.
**Wagoner:** Downing
**Weleetka:** Daniels

## OREGON

**Ashland:** W. Dept.
**Astoria:** City of Astoria, deJong
**Baker:** Dept. of W. Fire & Sanitation
**Bend:** Drost
**Camp Adair:** Wilmot
**Coquille:** Gearhart
**Corvallis:** Gallagher, Goodnight, Merryfield, Strange
**Dallas:** Soehren
**Eugene:** Cloyes, Vaaler, W. Bd.
**Forest Grove:** Weber
**Grants Pass:** Root, Signor
**Hillsboro:** City of Hillsboro Utils. Com.
**Klamath Falls:** Finley, Watkins
**Maplewood:** Hoffman
**Marshfield:** Chiene
**McMinnville:** McMinnville W. & Lt. Dept.
**Medford:** California Oregon Power Co., W. Com.
**Milton:** Kramer
**Milwaukee:** Bevington
**Newport:** Case
**Oswego:** Duis
**Pendleton:** Vaughan
**Portland:** Benedict, Boyle, Bur. of W.W., Charlton, Corey, Cunningham, Fague, Gearhart, Gibson, Green, Hanning, Home W. Dist., Hudrlik, Judson, Karr, Kipp, Koon, Lawrence, Morrow, Olsen, Poulter, A. H. Rice, E. G. Rice, Romig, Smith, Smithson, Spies, Stober, Strasser, Strudgeon, Thompson, Turner, Wagner, Willard
**Redmond:** Berning
**Salem:** Salem W. Com.
**Silverton:** Blust
**Tillamook:** Berkey
**Vanport City:** Brinkley, Ditto
**West Linn:** Volpp
**Warrenton:** Christy
**Woodburn:** Kleinsmith

## PENNSYLVANIA

**Abington:** Gilbert
**Alliquippa:** Grimshaw, Moore
**Allentown:** Bur. of W., Gillespie, Krum, McNally, Schnabel
**Ambler:** Keasbey & Mattison Co., Tech. Assn. Pulp & Paper Ind.
**Ambridge:** W. Dept.
**Ardmore:** Mowry
**Aspinwall:** Drake
**Beaver Falls:** Chandley
**Bellevue:** Chase
**Berlin:** W. Co.
**Berwick:** Multiplex Mfg. Co.
**Bethlehem:** Bethlehem Steel Co., City of Bethlehem, Payrow
**Birdsboro:** W. Co.
**Brackenridge:** Affrica
**Braddock:** Dillon
**Bradford:** Boncher, Dresser Mfg. Co., Ellenberger, Stewart
**Bristol:** Roberts
**Bryn Mawr:** Davis, Jenkins, Philadelphia Suburban W. Co., Shull
**Buena Vista:** Pletcher
**Burgettstown:** Columbia
**Butler:** Kelley
**Cambridge Springs:** Devore
**Camp Hill:** Buttler
**Carbondale:** McMullen
**Chambersburg:** Mowrey
**Cherry Tree:** Cameron
**Chester:** Armstrong, Dodd
**Claysville:** Paget
**Clearfield:** Nevling
**Coatesville:** Emigh
**Columbia:** Kain
**Coraopolis:** Harriger
**Darby:** Roberts Filter Mfg. Co.
**Downingtown:** Wagner
**Drexel Hill:** Glover
**Du Bois:** Bur. of W., Warren
**Easton:** Johnson
**Elizabeth:** Rooney
**Emaus:** Donaldson Iron Co.
**Erie:** Buzzard, Frazier, Hammermill Paper Co., Hays Mfg. Co., Johnson, Lechner, Palmer, Peterson, Turner
**Ford City:** Wintgens
**Fredericktown:** Johnston
**Freeport:** McDivitt
**Gettysburg:** Corle
**Greensburg:** Crownover, Morgan, Welsford
**Greenville:** Culver, Masters
**Grove City:** Breckenridge
**Harrisburg:** Berry, Daniels, Gannett, Glace, Matter, Moses, Scheffer, Wolfe
**Hazleton:** McGeehin
**Honesdale:** Williams
**Indiana:** Pharaoh
**Jenkintown:** Whitcomb
**Jersey Shore:** Jones
**Johnsonburg:** Gray
**Johnstown:** Byers, Kunkle, Ogborn
**Kane:** Newton
**Kittanning:** Bowser, Turping
**Lancaster:** Abraham, Brock, Duckworth, Goodell
**Langhorne:** Stompler
**Lansdale:** Lansdale Munic. Authority
**Latrobe:** Insull, Wedemeyer
**Lebanon:** McAdam
**Lemoyne:** Horner, Naylor, Rigling
**McDonald:** Snyder
**McKeesport:** Nelson, Opalco Lab., Trax
**Meadville:** Ellsworth, Young
**Media:** Hedgepeth, Moon
**Mertztown:** Atlas Mineral Products Co., Wirtz
**Milton:** Dowdell
**Minersville:** Borough Munic. Authority
**Monongahela City:** Nutt
**Mount Union:** Diven
**Natrona:** Knight
**Nazareth:** Flory
**Neville Island:** Pittsburgh Coke & Iron Co.
**New Brighton:** Goehring
**New Kensington:** Griffiths
**Newtown Square:** Shiddell
**North East:** Hutchinson
**Northampton:** De Groot, Fogelman
**Oil City:** Bur. of W.
**Philadelphia:** Acchione, Allen, Am. W. Softener Co., Baker, Bean, Becker, Beltz, Betz, Bird-Archer Co., J. Boardman, W. H. Boardman, W. A. Briggs Bitumen Co. Inc., Borden, Borst, Canuso, Coltart, Corin, Crawford, Daugherty, Day & Zimmermann Inc., Elias, Flynn, Friel, Gill, Goff, Greer, Gumaer, Halloran, Hardin, Hay, Haydock, Hubley, Joos, Kerr, Lawrence, Leadite Co. Inc., Maguire, Maynard, McHugh, McKay, McLaughlin, Meehan, Myers, Moerk, Morris, Mueller, Nelson, Ozone Processes Inc., Pardoe, Pennsylvania Salt Mfg. Co., Priester, Publicker Commercial Alcohol Co., Read, Ridenour, Ringer, R-S Products Corp., Schaut, Sheen, Simplex Valve & Meter Co., Strockbine, Thompson, Turner, U.S. Pipe & Fdry. Co., Van Loan, Van Zandt, Waters, Welch, Weston, R. D. Wood Co., T. V. Wood
**Philipsburg:** Rumberger
**Pittsburgh:** Andrews, Bankson, Baton, Beckwith, Boyles, A. M. Byers Co., Calgon Inc., Campbell, Chester, Crenshaw, Davis, Diamond Alkali Co., Donnan, Dotterweich, Durner, Eaton, Erickson, Gleeson, Golden-Anderson Valve Specialty Co., Harshbarger, G. L. Hendrickson, V. E. Hendrickson, Hoak, Jacobs, Johnson, Kennon, Kenny, Kerr, Kleber, Kneeland, Leopold, Lynn, Mansfield, Mellon, Meyers, Murdoch, National Tube Co., Ohio Salt Co., Pace, Pitt Constr. Co., Pittsburgh Equitable Meter Co., Pittsburgh-Des Moines Steel Co., Redington, Revelle, C. W. Rice, J. M. Rice, O. Rice, Rockwell, Rockwell Jr., Saner eisen, Scheinert, Snelsire, Stroyd Weidlein
**Pottstown:** Grubb
**Pottsville:** Clayton
**Reading:** Bur. of W., Chubb, Duncan, Heine, Leh, Merkel, O'Reilly, Sperry
**Rochester:** Baker, Eben, John
**Rockwood:** Stewart
**Roulette:** Gray Chem. Co., Twining
**Royersford:** Home W. Co.
**Sayre:** W. Co.
**Schuylkill Haven:** Edling
**Scranton:** Scranton-Spring Brook W. Serv. Co., Taylor, Vicker
**Selinsgrove:** Eyer
**Sewickley:** Comrs. of W.W.
**Shamokin:** D. E. McWilliams, J. S. McWilliams
**Sharon:** Hennings, McBride, Shenango Valley W. Co.
**Sharpsburg:** Farbacher
**Shillington:** Herneisen
**Smethport:** Oviatt
**Somerset:** Pile
**Springdale:** Baker, Watts
**State College:** Gulden, Mavis, Turner
**Tarentum:** Jack, Jackson
**Tyrone:** Hassler, Laughlin
**Uniontown:** Farson
**Verona:** Hayden, Suburban W. Co.
**Washington:** Braman, Buchanan
**Waynesboro:** Shank
**Waynesburg:** McClelland
**West Conshohocken:** Connor
**West Newton:** Fergus
**West Reading:** Borough of West Reading Bur. of W.
**Wilkes-Barre:** Bush
**Wilkinsburg:** Adams, Fox
**Williamsport:** Barrick, Darling Valve & Mfg. Co., Keliher
**Wynnewood:** Freeburn
**York:** Kable, S. Morgan Smith Co.

## RHODE ISLAND

**Bristol:** Carns
**Providence:** Builders-Providence Inc., Chem-Feeds Inc., Dillon, Harper, Hartley, Leveque, Omega Machine Co. Inc., Proportioneers Inc., Richardson, Shea, W. Supply Bd.
**Rumford:** Turner
**Woonsocket:** W. Dept.

## SOUTH CAROLINA

**Abbeville:** Townsend
**Aiken:** Sudlow
**Anderson:** Patterson
**Bennettsville:** Parks
**Camden:** Tobin
**Charleston:** Comrs. of Pub. Works, Gibson, McDowell, Parker Lab.
**Chesnee:** Marquis
**Chester:** McLure
**Clemson:** Watson

**Columbia:** Barber, Frick, Howe, Kolb, Tomlinson, White
**Dillon:** Davis
**Easley:** Rogers
**Fort Mill:** Lesslie
**Gaffney:** Gaffney
**Greenville:** Adams, Armstrong, Hawkins, Murray, Perry, Smith
**Greenwood:** Chapman
**Greer:** Lanford
**Laurens:** Lovejoy
**Lyman:** Bright
**Myrtle Beach:** Helms
**Newberry:** Schumpert, Wise
**Orangeburg:** Johnstone, Pearson
**Rock Hill:** Cranford, Kennedy
**Saluda:** Setzler
**Seneca:** Hunt
**Spartanburg:** Simms, White
**Summerville:** Moorer
**Sumter:** Ellis, Randle
**Union:** Wood
**Winnsboro:** Meng

## SOUTH DAKOTA

**Aberdeen:** Wells
**Flandreau:** Campbell
**Mitchell:** Mather
**Pierre:** Hopkins, Mathews, Towne
**Sioux Falls:** Connor, Rees, Sioux Falls W.W.
**Sturgis:** Davenport

## TENNESSEE

**Alcoa:** Bristol
**Athens:** Shawver
**Bristol:** City of Bristol
**Brownsville:** Davis
**Camden:** Holladay
**Chattanooga:** Bork, Morrison, Porzelius, Stromquist, Swearingen
**Clarksville:** Cunningham, Kleiser
**Columbia:** Williamson
**Cookeville:** Collier
**Crossville:** Brady
**Dyersburg:** Blakeman
**Erwin:** Brown
**Etowah:** Cantrell
**Fountain City:** Brickey
**Greeneville:** McAmis
**Jackson:** Frye, Gasell
**Kingsport:** Bailey, Tennessee Eastman Corp.
**Knoxville:** Bolieau, Clouser, Fleming, Kavanagh, Kittrell, Knoxville Elec. Power & W. Bd., Murphy, Ohr, Quinn
**Lebanon:** Martin
**Madison:** Suburban Util. Dist. of Davidson Co.
**Martin:** Biggs
**Memphis:** Comin, Fisher, Hoshall, Layne & Bowler Inc., Memphis Lt. Gas & W. Div., Reilly, Seay, Stanfield, Tuggle
**Murfreesboro:** Lovell
**Nashville:** Farrell, Fry, Holman, Johnson, Kershaw, Lawrence, F. J. Lewis, W. H. Lewis, Morton, Purdom, H. C. Saindon, P. C. Saindon, Schmidt
**Oak Ridge:** Armitage, Fletcher
**Old Hickory:** Eldridge
**Paris:** Howell
**Sewanee:** Beyer
**Signal Mount:** Guthrie
**Springfield:** Eidsen
**Tullahoma:** Jones

## TEXAS

**Albany:** Matthews
**Amarillo:** Moss
**Austin:** Bandy, Pillings, Connell, Davis, Ehlers, George, Graves, Green, Hastings, Holcomb, Jenkins, Lower Colorado River Authority, Montgomery, Mulholland, Paessler, Stephens, Turner
**Ballinger:** Northington
**Bastrop:** Stokes
**Beaumont:** Bernhagen, Bradshaw, Newnam, Vieno
**Big Spring:** McDaniel
**Bonham:** City W. Dept., Gouge, Jackson
**Brownfield:** Jones
**Brownwood:** Bettis
**Camp Barkeley:** Chick
**Cisco:** Kilpatrick
**Corpus Christi:** Central Power & Lt. Co., City of Corpus Christi, Cunningham, Dietz, Noyes, Renfro
**Dallas:** Baker, Billings, Brown, Cooke, Crossman, Dellone, Dickson, Dixon, Forrest, Fowler, Hanlon, Henry, Hoefle, Hughes, Hunt, Hunter, Lemert, Livingston, Morey, Myers, Powell, Puckhaber, Rosenthal, Santry, Schwob, Smith, Sohle, Southern Alkali Corp., Taylor, Van Gelder, Westmoreland, J. B. Winder, N. G. Winder
**Denison:** Brenneke
**Donna:** Collins
**Edinburg:** Rutherford
**El Campo:** Gresham
**El Paso:** Hinyard, Lasaga, Umbenhauer, W. Dept.
**Fort Worth:** Freese, Mahlie, Porter, Robinson, Stephens, Texas W. Co., Well Machinery & Supply Co.
**Freeport:** Axelrad
**Fritch:** Hammerschmidt
**Galveston:** Thornton
**Gladewater:** Parker
**Gonzales:** Nix
**Harlingen:** Joiner, Pattison's Southwest Labs.
**Haskell:** Gilstrap
**Hearne:** Beaumont
**Henderson:** Horner
**Houston:** Bakke, Bock, Bryan, City of Houston W. Dept., Consolidated Chem. Industries Inc., Fugate, Hamilton, Harvill, Hatch, Hofmann, Jensen, Lowe, Trow, White
**Jacksboro:** Tate
**Jacksonville:** Byron
**Kermit:** White
**Kerrville:** Weiss
**Kilgore:** Collins
**La Marque:** Paulus
**Laredo:** Hood
**Lubbock:** Clark, Newland
**Lufkin:** Carpenter
**Marshall:** Archbell
**McCamey:** Stutts
**Mexia:** Keef
**Midland:** Cole, McFarland
**Mineral Wells:** City W.W.
**Mission:** Hamlin
**Newgulf:** Texas Gulf Sulphur Co. Inc.
**Pampa:** W. & Sewer Dept.
**Paris:** Hicks
**Plano:** H. D. Steenson, S. M. Steenson
**Port Arthur:** Swanson
**Port Neches:** B. F. Goodrich Co., Hennon, Tudor
**Raymondville:** Tomme
**Rule:** Sellers
**San Angelo:** West Texas Utils. Co.
**San Antonio:** Bartlett, Booker, City W. Bd., Flannery, Griffeth, Helland, Langhammer, Maier, Pearl
**Sherman:** Russell
**South San Antonio:** Harding
**Sweeny:** J. S. Abercrombie Co.
**Sweetwater:** Duckett
**Temple:** Gresham, Trostle
**Texas City:** Pan Am. Refining Corp.
**Tyler:** Lloyd
**Uvalde:** Evans
**Velasco:** Dow Magnesium Corp.
**Vernon:** Cromwell
**Waco:** Abrams, Davis, Gooch, Griffith, Rohan
**Weslaco:** Dose
**Wichita Falls:** Benedict, Gates, Mace, Ward

## UTAH

**Fort Douglas:** Martin, Ravenscroft
**Ogden:** Rackham
**Provo:** Newell, Pacific States Cast Iron Pipe Co.
**Salt Lake City:** Arnold, Beers, Christensen, Painter, Salt Lake City Corp. W. Dept., Utah State Dept. of Health

## VERMONT

**Bennington:** Barber
**Burlington:** Moat, Moore
**Manchester Center:** Marsden
**Montpelier:** W. Dept.

## VIRGINIA

**Alexandria:** Lamond
**Arlington:** Atkinson, Baker, Beard, Carl, Engle, Gardner, Levie, Lowe, Lundberg, McCarthy, Snyder
**Ashland:** Goddin
**Blacksburg:** McGauhey, Pack
**Bristol:** City of Bristol
**Charlottesville:** City of Charlottesville, Wallace

**Clarksville:** Chandler
**Clifton Forge:** Carper
**Danville:** Brantly, Johnson
**Denbigh:** Lang, Pharr, Welsh
**Fairfax:** Corbalis, Johnson
**Falls Church:** Anderson, Mitchell
**Fort Belvoir:** Keatley, Lowe, Taylor, Wilke
**Fredericksburg:** Williams
**Galax:** Stockner
**Harrisonburg:** Myers
**Hot Springs:** Brown
**Lawrenceville:** Hayes
**Lexington:** Boykin, Hanes, Rice
**Lynchburg:** Burnett, Capron, Glamorgan Pipe & Fdry. Co., Lynchburg Fdry. Co., Odor, Roberts, Snead, Wagner, Wilson, Wright
**Madison Heights:** Mays
**Newport News:** Dugger, Harman
**Norfolk:** Fitzgerald, Hodges, Kegebein, Layne-Atlantic Co., Obernorfer, Price, Williams
**Orange:** Knoell
**Petersburg:** Davis
**Portsmouth:** Murden
**Radford:** Elder, Haney
**Richmond:** Baldwin, Bardwell, Blackwelder, Blankenship, East Coast W. Co., Henderlite, Lordley, Massey, Meredith, Messer, Miller, Mills, Phillips, Phipps & Bird Inc., Royer, Ruehl, Shewbridge, Siebert, Silcox, Smith, Snidow, Strother, Trimble
**Roanoke:** Crockett, Fisher, Kavanagh, Moore, Taylor
**Salem:** Chapman
**Staunton:** City of Staunton
**Suffolk:** Covell, Story
**Tabbs:** Palmer
**Virginia Beach:** Petty
**Williamsburg:** Woodbury
**Winchester:** Grant

## WASHINGTON

**Aberdeen:** Bowen
**Anacortes:** McCrory
**Auburn:** Gosney
**Bellingham:** Campbell, Gooch, Howard, Melbo, Mulhern, Odell, Tenney, W. Dept.
**Bothell:** Miller
**Bremerton:** Casad, Eckland, Jarstad, McKinstry
**Camas:** Smith
**Cashmere:** Jarvis
**Cathlamet:** Dickson
**Cheney:** Chambers
**Colfax:** Chase, Hickman
**Dayton:** Bamford
**Ellensburg:** Scott
**Elma:** Prickett
**Enumclaw:** Scott
**Ephrata:** Blanchard
**Everett:** W. Dept.
**Fort Lewis:** Larson
**Hoquiam:** Lovejoy, Sangder
**Kelso:** Alexander
**Kent:** Rod
**Longview:** Labsap
**Lynden:** Knittel
**Menlo:** Hazen
**Mercer Island:** Olson
**Mount Vernon:** Pub. Util. Dist. No. 1
**Okanogan:** Van Liew
**Olympia:** Williams
**Omak:** Hubbert
**Oroville:** LeMay
**Pasco:** McGhee
**Port Angeles:** Breitenbach, Dodge
**Pullman:** Nelson, Snyder
**Puyallup:** Padgett
**Raymond:** Buckingham
**Renton:** City of Renton, Del Guzzo, Dunden, Morrison, Nichols
**Richland:** Long
**Seattle:** Adams, Allen, Benson, Botten, Bow, M. S. Campbell, W. F. Campbell, Cook, Edwards, Federal Pipe & Tank Co., Fowler, Gibson, Gill, Hallgren, Harris, Heiss, Hill, Hitchings, Howard, Hydraulic Supply Mfg. Co., Kimball, Krogstadt, Marckmann, McFadden, Miller, Mills, Osberg, Osborne, Parker, Parks, Purcell, Ruppert, Schunke, Seufer, Sisler, Tangney, Turner, Tyler, Wartelle, W. Dept.
**Shelton:** Brewer
**Snohomish:** Lysons
**Spokane:** City of Spokane, Fisken, Harvey, Hedman, Jensen, Jones, Judd, Leaver, Washington W. Power Co.
**Steilacoom:** Dowlin, Harlock
**Sumner:** Coffman
**Tacoma:** Crosby, Crusoe, Green, Harstad, Henzell, Hooker, Kunigk, Larson, Shaneman, Smith, Stenger, Worthen
**Vancouver:** Armstrong, Pfeifer, Ray
**Walla Walla:** McLean
**Wenatchee:** Dunstan, Hickcox, Sterling
**Winlock:** Leonard
**Yakima:** Gilman, Hall

## WEST VIRGINIA

**Alderson:** Straight
**Alloy:** Topham
**Beckley:** Farmer
**Benwood:** Davis
**Bluefield:** Rhoads
**Charleston:** Blair, Bradley, Cheshire, Cox, Gidley, Harrington, Haynes, Kelso, MacDonald, McCall, McLaughlin, Moses, Musser, Nally, Pub. Serv. Com. of W.Va., Staub, Tingley, Turner, Veader, Watson
**Chester:** Young
**Clarksburg:** Boynton, Highland, Pears
**Clendennin:** Cantley
**Fairmont:** Buchanan, Cain, Kirchman
**Huntington:** Dale, Dwyer, Edwards, Jones, Keeler, Thornburg
**Kenova:** Cramer
**Kermit:** Stepp
**Keyser:** Blundon
**Logan:** Pure W. Co. Inc.
**Lumberport:** Harbert
**Madison:** Whitlock
**Matewan:** Smith
**Montcoal:** Beall
**Morgantown:** Hodge, Speiden
**Moundsville:** Hetzer
**New Cumberland:** Parsons
**Oak Hill:** Holy
**Parkersburg:** Underwood
**Piedmont:** Richards
**Point Pleasant:** Hauer
**South Charleston:** Carbide & Carbon Chems. Corp.
**Sheperdstown:** Waldeck
**Sistersville:** Hammel
**Spencer:** Payne
**Vienna:** Justus
**Weirton:** Simmons
**Welch:** Clark
**Wellsburg:** Morgan
**Weston:** Coger
**Wheeling:** Todd, Yates
**Williamson:** Offutt
**Williamstown:** Boyd

## WISCONSIN

**Algoma:** Storm
**Appleton:** Dimick, Gallaher
**Ashland:** Snow
**Baraboo:** Shaw, Sichler, Stearns
**Beaver Dam:** Munic. W. Dept.
**Beloit:** Febry
**Burlington:** Degen
**Chilton:** Roll
**Chippewa Falls:** Bott
**Clintonville:** Lyon
**Columbus:** Roob
**Cudahy:** Olien, Totka
**Delavan:** W. Com.
**Eau Claire:** Brown, Hovey
**Elkhorn:** Lt. & W. Com.
**Evansville:** Cary
**Fond du Lac:** City W. Dept.
**Gillett:** Sack
**Green Bay:** Allouez W. Dept., Green Bay W. Dept., Preble W. Dept.
**Janesville:** Griffey
**Jefferson:** Fischer
**Juneau:** Kadinger
**Kaukauna:** Weckwerth
**Kenosha:** W. Dept.
**Kimberly:** Rothchild
**La Crosse:** Barth, Murphy
**Ladysmith:** Whitmore
**Lake Geneva:** O'Neill
**Lomira:** Strobel
**Madison:** Bruden, Domogalla, Gauer, Jodaitis, Kirchoffer, Mead, Muegge, Nichols, Sawyer, Shoemaker, Smith, Ward, Warrick, Wirth, Woodburn
**Manitowoc:** Cannard, Staeffler
**Marinette:** W. Com.
**Marshfield:** Kipp, Spencer
**Menasha:** Widsteen

**Milwaukee:** Allis-Chalmers Mfg. Co., Ampco Metal Inc., Badger Meter Mfg. Co., Bohmann, Brown, Chain Belt Co., Cunliffe, Cutler-Hammer Inc., Dummer, Galloway, Grant, Gruetzmacher, Ihling, Kerslake, Klebenow, Lee, Moore, Rogers, Schmitt, Schwada, H. W. Thomas, N. A. Thomas, Town of Lake W. Util. Bd., Windfelder, Wright
**Neenah:** City W.W., Hanson, Westfahl
**Oconomowoc:** W. Dept.
**Oshkosh:** Eichinger, Hintz, Schneider
**Peshtigo:** W. Dept.
**Plymouth:** McGuire
**Port Washington:** Miller
**Portage:** Bryan
**Racine:** Griffith, McCarthy, Peirce
**Shawano:** Page
**Sheboygan:** Bd. of W. Comrs., Hartman, Zufelt
**Sheboygan Falls:** Langner
**South Milwaukee:** Lehman
**Sparta:** Hensel
**Stevens Point:** Somers
**Stoughton:** Dahle
**Sturgeon Bay:** Johnson
**Superior:** Corine, Sorenson
**Tomah:** Schroeder
**Tomahawk:** Munic. W. Util.
**Two Rivers:** Bartz, Capraro
**Watertown:** Reichardt
**Waukesha:** Kuranz
**Waupun:** Towne
**Wausau:** Leistikow
**Wauwatosa:** Fischer, Henke
**West Allis:** Singer
**West Bend:** Bremser
**West Salem:** Meyer
**Whitewater:** Drewry
**Wisconsin Dells:** Lee
**Wisconsin Rapids:** Doyle, Steib

### WYOMING

**Cheyenne:** Baldwin, Leonard, Sherard, Watson, Williams
**Gillette:** Streeter
**Laramie:** Ratcliffe
**Rawlins:** Davis
**Rock Springs:** Darling
**Sinclair:** Breniman
**Warren:** Ross

## CANADA

### ALBERTA

**Calgary:** Randle, Robinson
**Camrose:** Balshaw, Eby
**Drumheller:** Travis
**Edmonton:** City of Edmonton, McKay, Menzies, Watson
**Lethbridge:** Haimes
**Wetaskiwin:** Maggs

### BRITISH COLUMBIA

**Kamloops:** Corp. of City
**New Westminster:** City of New Westminster
**North Vancouver:** MacLean Weir Ltd., Valentine
**Oak Bay:** Musgrave
**Vancouver:** Belyea, Brakenridge, Cleveland, Dilworth, General Utils. Co. Ltd., Perry, Rome, Shanahan
**Vernon:** Tassie
**Victoria:** Bowering, Irwin
**West Vancouver:** Richardson

### MANITOBA

**Neepawa:** Harper
**St. Boniface:** Bibeau
**Winnipeg:** Brickenden, Cameron, Hurst, Keeping, Lindsten, Main, Scott

### NEW BRUNSWICK

**Moncton:** Evans

### NOVA SCOTIA

**Amherst:** Wightman
**Halifax:** Kaye, Macnab, McKay, Nova Scotia Bd. of Insurance Underwriters, Thomas
**Kentville:** Macdonald
**Truro:** Gordon
**Wolfville:** Leverin

### ONTARIO

**Amherstburg:** Hatch, Wilson
**Ancaster:** Lyons
**Aylmer:** McBrien
**Barrie:** Pub. Utils. Com.
**Belle River:** Gauthier
**Belleville:** Pub. Utils. Com.
**Bowmanville:** Chase
**Bracebridge:** Ball
**Brampton:** W. Com.
**Brantford:** Catton, Gibbons, Jordan, Pub. Utils. Com., Roberts
**Brockville:** Farquharson
**Burlington:** Edwards
**Campbellford:** Denyes
**Carleton Place:** Rogers
**Chatham:** Bd. of W., Carter, O'Mara
**Chesley:** Grabb
**Clinton:** Pub. Utils.
**Cobourg:** McIntosh
**Cochrane:** Oke
**Cooksville:** Maxwell
**Cornwall:** Magwood
**Crystal Beach:** Hallgren
**Deseronto:** Pub. Utils. Com.
**Dresden:** Town of Dresden
**Dundas:** Pub. Utils. Com.
**Dunnville:** Pub. Utils. Com.
**Elmira:** Bowman
**Essex:** Truesdale
**Exeter:** Lampman
**Forest:** Ellerker
**Fort Erie:** Barton
**Fort William:** Woodhouse
**Galt:** Cuthiell
**Gananoque:** W.W. Com.
**Goderich:** Kelly
**Gravenhurst:** Elec. Lt. & W. Com.
**Guelph:** Chalmers, City of Guelph, Mountford
**Hamilton:** Buckley, Darling, Hetherington, Matheson, McFaul, Veale
**Hanover:** Pub. Utils. Com.
**Hawkesbury:** Wang
**Hespeler:** Meyer
**Huntsville:** Soden
**Ingersol:** Hall
**Islington:** Township of Etobicoke
**Kenora:** McCoombs
**Kincardine:** MacDonald
**Kingston:** Lee, Utils. Com.
**Kirkland Lake:** Township of Teck
**Kitchener:** Pequegnat, W. Com.
**Leaside:** Burgess, Ruscica
**Lindsay:** Thompson
**Listowel:** Hanna
**London:** Buchanan, Charles, Hodkinson, Kirk, McManamna, Pub. Utils. Com., Wilson
**Long Branch:** Randall
**Meaford:** Brown
**Merritton:** Pub. Utils. Com.
**Midland:** Pub. Utils. Com.
**Napanee:** Dafoe
**New Liskeard:** Sutcliffe
**New Toronto:** Pub. Utils. Com.
**Newmarket:** W. & Lt. Com.
**Niagara Falls:** Acres, Pringle, Warder
**Niagara-on-the-Lake:** Town of Niagara W. Dept.
**North Bay:** City of North Bay
**Oakville:** Nichol, W. & Lt. Com.
**Orangeville:** Marshall
**Orillia:** W. Lt. & Power Com.
**Oshawa:** Pub. Utils. Com.
**Ottawa:** Edmonds, Ferguson, Hoey, Lawson, MacDonald, McIntyre, Stockwell
**Owen Sound:** Neath, Waddell
**Palmerston:** Forster
**Paris:** Pub. Utils. Com.
**Pembroke:** Howe
**Penetanguishene:** W. & Lt. Com.
**Perth:** Smith
**Peterborough:** Dobbin, Harrison, Utils. Com.
**Petrolia:** Weaver
**Pickering:** McLean
**Picton:** Tait

**Porcupine:** Township of Whitney
**Port Arthur:** Chandler, Flook
**Port Colborne:** Grassie
**Port Credit:** Parkinson
**Port Dalhousie:** Hare
**Port Dover:** King
**Port Hope:** W.W. Com.
**Port Stanley:** Guttridge
**Prescott:** Dowsley
**Preston:** Lt. & W. Com.
**Ridgetown:** Pub. Utils. Com.
**St. Catharines:** McPhail
**St. Marys:** Pub. Utils.
**St. Thomas:** Miller, Pub. Utils. Com.
**Sarnia:** Hall, Milne
**Sault Ste. Marie:** Cornell
**Simcoe:** Pub. Utils. Com., Stalker
**Smiths Falls:** Mayhew
**South Porcupine:** Anderson
**Southampton:** Calder
**Staynor:** Spellman
**Stratford:** Manson
**Strathroy:** Pub. Utils. Com.
**Sudbury:** Martindale
**Swansea:** Ternent
**Tavistock:** Pub. Utils. Com.
**Tecumseh:** Arbour, Riley
**Thorold South:** Moore
**Tilbury:** Pub. Utils. Com.
**Tillsonburg:** Pub. Utils. Com.
**Timmins:** Corp. Town of Timmins, Pritchard
**Toronto:** Anderson, Angus, Argo, Ball, Berry, Bilbrough, Bond, Brown, Burn, Crase, Davis, De Laporte, Duncan, East York Township, Forest Hill W.W. System, Galimbert, Gass, Harris, Howard, Hulse, Illman, Jacklin, Jennings, John Inglis Co. Ltd., Johnston, Kennedy, Kinney, Leitch, MacLaren, Mason, McDonald, McGuire, McRae, Mills, Mimico Pub. Utils. Com., Morgan, Munro, Potter, Powell, Proctor, Redfern, Reid, Routledge, Russell, Sanderson, Scarborough Pub. Utils. Com., Scheak, Stewart, Stinson, Storrie, Thompson, Toronto Dept. of Works, Van Burek, Walker, W. & Sewage, White, Wilkes, Williamson, Woolidge, York Township
**Trenton:** Pub. Utils. Com.
**Walkerville:** Kerr
**Wallaceburg:** W. Com.
**Waterford:** Pub. Util. Com.
**Waterloo:** Hertel
**Watford:** Fuller
**Welland:** Bd. of W. Comrs.
**Weston:** Peirson
**Wheatley:** Chute
**Whitby:** Pub. Util. Com.
**Wiarton:** Dunham
**Willowdale:** North York Township
**Windsor:** Armstrong, Hanna, Keith, Kellner, Medlar, Strickland, Taylor, Utils. Com.
**Wingham:** Jeffs
**Woodstock:** Newby, Sullivan

### PRINCE EDWARD ISLAND

**Charlottetown:** Matheson

### QUEBEC

**Arvida:** Aluminum Co. of Canada Ltd.
**Chicoutimi:** Proulx
**Dorval:** Gouin
**Grand'mere:** Villemure
**Lachine:** Deslauriers
**Malartic:** Duff, Dumas
**Montreal:** Bird-Archer Co. Ltd., Borgford, Cyr, Doig, Dorrance, Fairbairn, Hill, Hunter, Hutchison, Laferriere, Lafreniere, Lea, McCrady, Meadows, Mercer, Plamondon, Simard, Tessier, Tomlinson, Vincent
**Pointe Claire:** Keene
**Quebec:** Pub. Serv. Bd., Tremblay
**Shawinigan Falls:** Dorion
**Temiskaming:** Grimmer
**Trois-Rivieres:** Dufresne, Poisson
**Valleyfield:** Belanger
**Verdun:** Des Baillets, Hadley, Harrington

### SASKATCHEWAN

**Moose Jaw:** Fawkes
**Regina:** Hainstock, Schaeffer, W.W. Dept.
**Saskatoon:** Underwood
**Swift Current:** Ashford
**Yorkton:** Jackson

## CUBA

**Caibarien:** Bergnes
**Camaguey:** Everett
**Cardenas:** Asunsolo
**Guantanamo Bay:** Daple
**Havana:** Bequer y Herrera, Cia de Acueducto de Cuba, Corvison, Cosculluela, Daniel, de Goicoechea, de Sena, Docal, Echarte y Romero, Escoto, Fernandez y Simon, Garcia-Montes, Granda y Deben, Machado, E. Martinez, R. A. Martinez, S. S. Martinez, Miguel, Mira, Pedroso y Montalvo, Montoulieu, Nunez, Portal, Puente, Roig, Santana, Thomson, Vallee, Victory, Villa
**Matanzas:** Jordan
**Oriente:** Barrows

## OTHER THAN UNITED STATES, CANADA AND CUBA

### ALASKA

**Juneau:** Alter, Green
**Ketchikan:** Carlson

### ARGENTINA

**Buenos Aires:** Lockwood, Negri, Obras Sanitarias de la Nacion, Paitovi, Trelles
**Rosario de Santa Fe:** Buchanan, Lasso

### AUSTRALIA

**Burnley:** Bowen, Shoppee
**Lindfield:** Murray
**Melbourne:** Martin, Melbourne & Metropolitan Bd. of Works, O'Nial, Ritchie, Smith
**Mildura:** Hughes
**Queensland:** Simmonds
**Sydney:** Nicol

### BRAZIL

**Bahia:** Servicos de Aguas e Esgotos, Tournillon, Velloso
**Niteroi:** Boeckel, Cia Brasileira de Aguas e Esgotos
**Rio de Janeiro:** de Brito, Henriques

### BRITISH WEST INDIES

**Jamaica:** Kirkpatrick

### CANAL ZONE

**Balboa:** Hatch
**Cristobal:** Dunn

### COLOMBIA

**Bogota:** de Santamaria, Guerrero, Mejia, Noguera S.

### COSTA RICA

**San Jose:** Picado

### EQUADOR

**Quito:** Ponce M., Smith

### ENGLAND

**Birmingham:** Golder
**Bournemouth:** Moon
**Harrow:** Waddington
**London:** Berry, Cook, Cronin, Dagley, Howland, Inst. of W. Engrs., Liffen, Moir, Paterson
**Manchester:** Hallam
**Orpington:** Compton
**Romford:** Strachan
**Staines:** Palmer
**Torquay:** Elliot
**Wolverhampton:** Page

### GUATEMALA

**Guatemala City:** Compania del Agua del Mariscal

### HAWAII

**Holualoa:** Tay

**Honolulu:** Bd. of W. Supply, McMorrow, Nasi, Tyler

### INDIA

**Calcutta:** Deo, MacGregor

**Manbhum:** Aga

### MEXICO

**Chihuahua:** Junta Central de Aguas del Estado

**Mexico City:** Banco Nacional Hipotecario Urbano y de Obras Publicas, Castilla, Cornejo, Molina, Villa-Acosta

**Polanco:** Arteaga

**San Luis Potosi:** Fitzmaurice

**Veracruz:** Alarcon

### NEW ZEALAND

**Dunedin:** Scoular

### PERU

**Lima:** Sanchez

### PUERTO RICO

**San Juan:** Hernandez, Ortega

### SCOTLAND

**Edinburgh:** Fulton, McDiarmid

### SWEDEN

**Stockholm:** Jansa, Ljunggren

### URUGUAY

**Montevideo:** Altoberro

### VENEZUELA

**Caracas:** Acevedo-Quintana, Ayala H., Azpurua Q., Berk, Blanch G., Bunker, Carrillo, Cook, Disario, Klindt B., Leon D., Lilue, Martinez-Ponte, McCarthy, Molina, Perez Guerra, Rodriguez P., Smith, Stolk, Uslar, Vicentini G.

**Merida:** Alizo

**Trujillo:** Uban

# DIRECTORY OF COMMITTEES

## *As of August 1, 1944*

## GENERAL COMMITTEES

### EXECUTIVE COMMITTEE OF THE DIRECTORS

Samuel F. Newkirk, Jr., *Chairman*
Wm. W. Brush
E. Sherman Chase
Linn H. Enslow
Clinton Inglee

### GENERAL POLICY COMMITTEE

*Representatives of A.W.W.A.*

Samuel B. Morris, *Chairman*
Samuel F. Newkirk, Jr.
Norman J. Howard
Louis R. Howson
Abel Wolman

*Representatives of W. & S.W.M.A.*

Denis F. O'Brien
Wm. J. Orchard

This is a standing committee charged with the duty of formulating basic policies of the Association with regard to the field and extent of its activities, and the development and activities of Local Sections, as well as a number of other broadly related and fundamental subjects.

### FINANCE COMMITTEE

Wm. W. Brush, *Chairman (Ex Officio)*
C. J. Alfke
Boyd A. Bennett
P. B. Niles
Harry E. Jordan *(Ex Officio)*

This committee advises the Treasurer and Secretary in the conduct of the financial affairs of the Association.

### PUBLICATION COMMITTEE

Linn H. Enslow, *Chairman*
Sidney S. Anthony
Albert E. Berry
Herbert H. Brown
Wm. W. Brush
Edgar J. Buttenheim
Chas. H. Capen
Chas. R. Cox
W. W. DeBerard
Roger W. Esty
Raymond J. Faust
Melvin P. Hatcher
Louis R. Howson
L. A. Jackson
Wendell R. LaDue
Samuel B. Morris
Reeves Newsom
Malcolm Pirnie
G. B. Schunke
Thos. J. Skinker
Geo. J. Turre
Paul Weir
W. Victor Weir
Abel Wolman
Harry E. Jordan *(Ex Officio)*

This committee plans the annual meeting program and has general control of all publications.

## CONSTITUTION AND BY-LAWS COMMITTEE

Ross L. Dobbin, *Chairman*
Wm. W. Brush
H. N. Lendall
Dale L. Maffitt
Harry E. Jordan

This committee considers and makes recommendations concerning desired amendments to the Constitution or By-Laws of the Association. It also passes upon all new By-Laws, or amendments to the By-Laws, of Divisions and Sections of the Association.

## HONORARY MEMBERSHIP COMMITTEE

*(1944)*

Samuel F. Newkirk, Jr., *Chairman*
Abel Wolman
Samuel B. Morris

This is a committee of the Directors. It makes recommendations for election to Honorary Membership in the Association. It usually is made up of the President and the last two Past Presidents.

## THE JOHN M. DIVEN MEMORIAL MEDAL COMMITTEE

*(1944)*

Malcolm Pirnie, *Chairman*
Linn H. Enslow
Frank C. Amsbary
A. Clinton Decker
A. P. Kuranz

This committee makes recommendation to the Directors concerning the award of the Diven medal. It consists of the chairmen of the Water Works Practice and Publication Committees and the past chairman of each of the three Divisions.

## THE JOHN M. GOODELL PRIZE COMMITTEE

*(1944)*

C. K. Calvert ('45), *Chairman*
H. H. Brown ('46)
W. L. McFaul ('47)

This committee makes recommendation to the Directors concerning the award of the Goodell prize. Each member serves three years.

## CONVENTION PLACE COMMITTEE

*Representatives of A.W.W.A.*

Louis R. Howson, *Chairman*
Abel Wolman
Samuel B. Morris
Harry E. Jordan

*Representatives of W. & S.W.M.A.*

D. S. McAfee
Chas. A. McGinnis
Chas. H. Becker

This committee makes recommendation to the Directors concerning the location and date of the Association's annual meeting.

## CONVENTION MANAGEMENT COMMITTEE

*Representatives of A.W.W.A.*

Wm. J. Orchard, *Chairman*
Thos. J. Skinker
W. Victor Weir

*Representatives of W. & S.W.M.A.*

Clinton Inglee
Chas. A. McGinnis

*Ex Officio*

Samuel F. Newkirk, Jr., *Pres., A.W.W.A.*
Harry E. Jordan, *Secy., A.W.W.A.*
Linn H. Enslow, *Chr., Publ. Com., A.W.W.A.*
Chas. H. Becker, *Pres., W. & S.W.M.A.*
Arthur T. Clark, *Secy., W. & S.W.M.A.*

This committee is in charge of the management of all details of the Association's annual meetings except the program and the choice of location and date.

## COMMITTEE ON NATIONAL WATER POLICY

Abel Wolman, *Chairman*
Frank A. Barbour
Louis R. Howson
Samuel B. Morris
Howard Scott Morse

This committee is charged with the duty of observing the plans and actions of the Federal Government and its allied groups and of representing the Association in any actions on subjects being considered by them.

## COMMITTEE ON SOCIAL SECURITY LEGISLATION

Dale L. Maffitt, *Chairman*
Roger W. Esty
W. C. Flanders
Leon A. Smith
Geo. C. Sopp

This committee, the organization of which was authorized in January, 1937, was formed for the purpose of following developments in Social Security Legislation and of keeping the Association informed on the subject.

## COMMITTEE ON WARTIME ACTIVITIES

Louis R. Howson, *Chairman*
Boyd A. Bennett
R. K. Blanchard
Eugene F. Dugger
Dale L. Maffitt
Philip B. Niles
Hubert F. O'Brien
Thos. J. Skinker
Abel Wolman
Harry E. Jordan

The function of this committee is to obtain accurate data concerning the materials and supply situation within the water supply field; to present the situation to the proper authorities in Washington and obtain such rulings as may be possible; and to transmit the information thus obtained to the water works management field.

## COMMITTEE ON MUNICIPAL WATER WORKS ORGANIZATION

Wendell R. LaDue, *Chairman*
H. H. Brown
H. L. Clark
O. E. Eckert
D. L. Erickson
G. L. Fugate
W. R. Gelston
G. F. Hughes
Homer A. Hunter
J. Clark Keith

K. K. KING
L. G. LENHARDT
JOHN S. LONGWELL
A. K. MADDOX
D. L. MAFFITT
M. H. MCGUIRE
WM. P. MELLEY
CHAS. E. MOORE
S. F. NEWKIRK, JR.
W. A. PEIRCE
WADE PLUMMER
GEO. J. ROHAN
E. E. SMITH
L. A. SMITH
H. A. VAN NORMAN

This committee was organized to study existing state laws and municipal ordinances, and to formulate principles relating to forms of management of municipal water works systems.

## WATER WORKS PRACTICE COMMITTEES

### COMMITTEE ON WATER WORKS PRACTICE

MALCOLM PIRNIE, *Chairman*
FRANK A. BARBOUR
CHAS. R. COX
W. W. DEBERARD
R. L. DOBBIN
EUGENE F. DUGGER
ARTHUR E. GORMAN
LOUIS R. HOWSON
REEVES NEWSOM, *Vice-Chairman*
WM. W. HURLBUT
W. R. LADUE
DALE L. MAFFITT
DENIS F. O'BRIEN
W. H. WEIR
W. VICTOR WEIR
ABEL WOLMAN

The Committee on Water Works Practice is in responsible charge and control of all technical activities of the Association. Article IX, Section 2 of the By-Laws states: "Any resolution, report or publication which undertakes to establish in the name of the Association, or any of its Sections or Divisions, professional or technical standards, shall be submitted to this Committee, and it shall direct all such matters on behalf of the Association. It shall give notice by publication to the membership of all such proposed standards and report its approval or disapproval of such to the Board. It shall appoint such Sub-Committees as it may deem necessary to properly carry on its work."

There follows the list of projects which have been authorized and the Sub-Committees which have been organized to carry on the activities under the direction of the Committee on Water Works Practice.

If the title of the project is not followed by one or a series of names, no work has been undertaken. If a single name follows the title, that one person is an *adviser* upon the subject. Fully organized committees are indicated by listed personnel and description of the work in hand.

### COMMITTEE 1—BASIC WATER WORKS DATA

ELSON T. KILLAM, *Adviser*

### COMMITTEE 2—SURFACE WATER ALLOCATION

### COMMITTEE 3—WATERSHED PROTECTION AND MAINTENANCE

*General Chairman to be appointed.*

Sub-Committee on Forestation . . . . . E. E. MINOR, *Chairman*
Sub-Committee on Erosion Control . . . . . JOHN S. LONGWELL, *Chairman*
Sub-Committee on Public Use of Watershed Areas . . . . . L. S. FINCH, *Chairman*

The function of this committee is to assemble data concerning the maintenance and control of public water supply watersheds and impounding reservoir areas, particularly as related to the (1) engineering and financial value of forestation; (2) control of soil erosion both in normal rainfall and semi-arid areas; and (3) extent and control of use of watershed and reservoir areas by the public.

## COMMITTEE 4—GROUND WATER COLLECTION

OSCAR E. MEINZER, *Adviser*

### *Committee 4A—Deep Wells and Deep Well Pumps*

J. ARTHUR CARR, *Chairman*
STEPHEN M. DUNN
ALBERT G. FIEDLER
ROBT. W. HARDING
ANGUS D. HENDERSON
C. M. MCCORD
JAMES C. HARDING, *Co-Chairman*
W. W. MOREHOUSE
O. J. MUEGGE
MARCEL PEQUEGNAT
LEON A. SMITH
C. M. STANLEY
REEVES NEWSOM, *Adviser*

This committee has been assigned the duty of developing standard specifications for the construction and testing of deep wells, as well as the purchase requirements for, and method of testing deep well pumps. Details such as alignment, plumbness, casing materials, general safety considerations, sterilization, testing, etc., will be included in the well specifications. Specifications relating to the purchase and acceptance testing of pumps will outline the information which should be furnished to the manufacturer by the purchaser and which should be furnished by the purchaser to the manufacturer. They will also include methods of testing after installation for purposes of determining the degree of conformance to the specifications. Both sets of specifications have been prepared and circulated. Final draft of the text is anticipated by the end of 1944.

## COMMITTEE 5—MANUAL OF WATER QUALITY AND TREATMENT

A. CLINTON DECKER, *Editorial Chairman*

*Sub-Editors:*

Chapter

1 CHARACTERISTICS OF AVAILABLE SOURCES
E. SHERMAN CHASE

2 ORGANISMS IN WATER
FRANK E. HALE AND MAX LEVINE

3 STANDARDS OF QUALITY
CHAS. R. COX

4 PURIFICATION OCCURRING IN STREAMS, LAKES AND RESERVOIRS
RAY F. GOUDEY AND O. J. MUEGGE

5 PARTIAL TREATMENT AND TREATMENT PRELIMINARY TO FILTRATION
DOUGLAS FEBEN, JOHN R. BAYLIS, E. B. EVANS AND GEO. D. NORCOM

6 COAGULANTS AND COAGULATION
A. P. BLACK AND L. L. HEDGEPETH

7 CHLORINE AND OTHER CHEMICALS
F. W. GILCREAS, N. S. CHAMBERLIN AND HARRY FABER

8 TASTES AND ODORS
J. E. KERSLAKE, A. E. GRIFFIN AND E. A. SIGWORTH

9 FILTRATION
C. K. CALVERT, THOS. R. CAMP, EUGENE A. HARDIN AND CARL J. LAUTER

10 CHEMICAL CONDITIONING OF WATERS
CHAS. P. HOOVER AND W. F. LANGELIER

11 TREATMENT PLANT CONTROL
PAUL WEIR AND W. VICTOR WEIR

This Manual, first published in 1940, is now being re-edited. Issue of the revised text is anticipated in 1945. (See page 139 for description of 1940 edition.)

### *Committee 5A—History of Water Purification*

MOSES N. BAKER, *Chairman*

Mr. Baker has conducted an extensive research in this country and abroad in the preparation of a record of the developments which have led to modern water treatment. "The Quest for Pure Water" is now in press.

### *Committee 5B—Safe Handling of Water Works Chemicals*

MARSDEN C. SMITH, *Chairman*
GEO. H. FENKELL
ARTHUR E. GORMAN
FRANK E. HALE
NORMAN J. HOWARD
LINN H. ENSLOW
H. H. GERSTEIN
RAY F. GOUDEY
L. L. HEDGEPETH
HAROLD S. HUTTON
WINFIELD S. MAHLIE

This committee was organized to study and report upon the methods of safe handling of chemicals used in water purification. (See page 142 for reports published.)

## COMMITTEE 6—POWER AND PUMPING

C. B. BURDICK, *Adviser*

## COMMITTEE 7—TRANSMISSION AND DISTRIBUTION

### *Committee 7A—Steel Plate Pipe*

WM. W. HURLBUT, *Chairman*

*Consumer Members*
FRANK A. BARBOUR
WM. W. BRUSH
GEO. H. FENKELL
FRED MORSE RANDLETT
JOHN F. SKINNER
THOS. H. WIGGIN

*Producer Members*
RUSSELL E. BARNARD
GEO. B. MCCOMB
C. S. PATTON

This committee has been assigned the duty of developing standard specifications for steel water pipe and protective coatings and linings therefor. It has also been authorized to prepare a "Manual for Design and Installation of Steel Water Pipe Lines." Official documents previously prepared by this committee are listed on pages 140 and 141.

By authority of the Board of Directors there has been established a Steel Water Pipe Manufacturers Technical Advisory Committee for the purpose of giving the A.W.W.A. Committee on Steel Plate Pipe information and advice concerning the production and protection of steel water pipe. (See Jour. A.W.W.A., **33**: 1716 (1941).) The officers of this advisory committee are H. R. Redington, Chairman; Walter H. Coates, Secretary.

### *Committee 7B—Reinforced Concrete Pipe*

ERNEST W. WHITLOCK, *Adviser*

This assignment covers the preparation of Specifications for Reinforced Concrete Pipe. Tentative Emergency Specifications for Reinforced Concrete Pipe were adopted in March 1943. (See reference to document on page 141.) Preparation of Tentative Specifications for Prestressed Concrete Pipe has been authorized.

### *Committee 7C—Cast-Iron Pipe*

The work which would ordinarily be undertaken by this sub-committee is being carried on by Sectional Committee A21, on Specifications for Cast-Iron Pipe, Thomas H. Wiggin, Chairman. This is a joint committee organized under the procedure established by the American Standards Association and on which the American Water Works Association is represented. This committee is listed under Joint Committees.

### *Committee 7D—Laying Cast-Iron Pipe*

JOS. P. SCHWADA, *Co-Chairman*
ROGER W. ESTY
W. A. GLASS
LAURENCE E. GOIT
HOMER A. HUNTER
H. W. NIEMEYER
GUSTAV J. REQUARDT
H. LLOYD NELSON, *Adviser*
CECIL K. CALVERT, *Co-Chairman*
K. W. BROWN
H. O. HARTUNG
GEO. D. NORCOM
H. P. STOCKWELL, JR.
NORTON A. THOMAS
C. F. WERTZ
A. E. GRIFFIN, *Adviser*

This committee has been reorganized during 1944 and is charged with (1) preparation of Specifications for Laying Cast-Iron Pipe; and (2) preparation of a Manual of Practice related to cleaning and sterilization of water mains, conduits, etc.

### *Committee 7E—Asbestos-Cement Pipe*

### *Committee 7F-1—Fire Hydrants*

ROGER W. ESTY, *Chairman*
ROBT. C. DENNETT
RICHARD H. ELLIS
L. A. JACKSON
R. C. KENNEDY
EARL E. NORMAN
CHAS. H. BECKER, *Adviser*
JOS. W. RANDLETTE, *Adviser*

This committee was reorganized in 1944 and charged with the revision of the 1940 Specifications for Fire Hydrants.

### *Committee 7F-2—Sluice Gates*

WM. R. CONARD, *Chairman*
BURTON S. GRANT
J. ARTHUR JENSEN
THOS. J. SKINKER
FRANK H. STEPHENSON

This committee is charged with the review of the Tentative Specifications for Sluice Gates which were approved (as tentative) in 1941, but which have not been advanced to standard status.

### *Committee 7F-3—Valves*

FRED M. RANDLETT, *Chairman*
SYDNEY J. BENEDICT
D. L. ERICKSON
V. C. LISCHER
A. T. LUCE
B. E. PAYNE
HUBERT F. O'BRIEN, *Adviser*

This committee was reorganized in 1944 and charged with the revision of the 1938 Specifications for Water Works Distribution Valves. It is also advised to consider standardization of flanged cast iron body valves for pumping station and filtration plant use.

### *Committee 7G—Location Records and Maintenance of Mains and Services*

W. Victor Weir, *Chairman*
Wm. G. Banks
Albert R. Davis
John C. Detweiler
Roger W. Esty
Maurice N. Gerardy
Harold B. Gotaas
Bard Livingstone
A. B. Manson
Frederick Ohrt
George Tatnall

### *Committee 7H—Steel Standpipes and Elevated Tanks*

Louis R. Howson, *Chairman*

This committee has been set up as a joint committee of the American Water Works Association, the American Welding Society and the New England Water Works Association. See listing under Joint Committees.

### *Committee 7I—Pipe Line Coefficients*

Clinton L. Bogert, *Chairman*
H. G. Acres
Chas. H. Capen
Egbert D. Case
James E. Gibson
L. E. Goit
Reeves Newsom
George D. Norcom
Thos. J. Skinker
Thos. F. Wolfe

Established in 1936, at the suggestion of the New England Water Works Association, this committee's purpose is to cooperate with that association in the preparation of a report covering a wider geographic field than was covered in the report of the New England committee.

### *Committee 7J—Distribution System Safety*

Wm. E. Stanley, *Chairman*
A. E. Berry
C. K. Calvert
M. W. Cowles
F. M. Dawson
A. E. Gorman
R. F. Goudey
J. Arthur Jensen
W. R. LaDue
F. A. Marston
D. H. Maxwell
L. F. Warrick

This committee has as its scope the definition of the structural and sanitary hazards which may be encountered in the distribution of public water supplies and the determination of reasonable means of obtaining structural safety and the elimination of sanitary hazards.

There are excepted from the scope of the committee's activities the following topics: Power and pumping economics; specifications for steel pipe; specifications for cast-iron pipe and fittings; specifications for reinforced concrete pipe; specifications for laying cast-iron pipe; specifications for valves and hydrants; specifications for asbestos-cement pipe; specifications for standpipes and elevated tanks; specifications for service line materials; specifications for meters; location records of mains and services; and methods of control of cross-connections.

(See page 142 for Tentative Manual published.)

### *Committee 7K—Cross-Connections*

M. Warren Cowles, *Chairman*
E. Sherman Chase
F. M. Dawson
Roy E. Dodson, Jr.
G. Taylor Evans
Ray F. Goudey
W. Scott Johnson
Warren J. Scott
H. E. Halpin, *Adviser*
Harvey T. Munn, *Adviser*

This committee was organized for the purpose of correlating information concerning the control of cross-connections. A report was published in the January 1942 JOURNAL. Further studies are now in progress.

### *Committee 7L—Fire Prevention and Protection*

CHAS. J. ALFKE, *Chairman*
PHILIP BURGESS
E. F. DANDRIDGE
CARLETON E. DAVIS
HARRY U. FULLER
D. D. GROSS
L. W. HELMREICH
LOUIS R. HOWSON
DALE L. MAFFITT
CALEB MILLS SAVILLE
JACOB SCHWARTZ
LEON A. SMITH
WM. STORRIE

This committee is charged particularly with:

1. The promotion of an understanding on the part of water works men, as well as on the part of the public, of the effect that fire protection facilities have upon the total amount of capital invested in public water supply projects.
2. Encouragement of the development of rational water rate structures which take into account the amount which should accrue in payment for fire protection.
3. The development of an understanding of a reasonable basis of charges for private fire protection and defense against unreasonable attacks upon these charges.

### *Committee 7M—Meters*

SAMUEL F. NEWKIRK, JR., *Chairman*
EDW. V. BUCHANAN
JAMES G. CARNS
A. P. KURANZ
H. W. NIEMEYER
H. V. PEDERSEN
GEO. J. ROHAN
GEO. C. SOPP
L. S. VANCE
W. VICTOR WEIR

Tentative Specifications for Current and Compound Meters, as well as a revision of the Tentative Specifications for Fire Service Meters, have been prepared and are now in circulation within the committee.

(See page 142 for specifications published.)

### *Committee 7N—Electrolysis and Electrical Interference*

M. WARREN COWLES
CHAS. F. MEYERHERM (*Secretary to Com.*)
E. E. MINOR

This committee has been working on problems in connection with the electrolysis of water pipes, and in particular, on questions concerning the use of water pipes as a means of grounding electrical systems.

### *Committee 7S—Service Line Materials*

WALTER A. PEIRCE, *Chairman*
FRANK C. AMSBARY, JR.
BERNARD W. CULLEN
JOHN C. DETWEILER
HARRY U. FULLER
ROBT. W. FURMAN
DWIGHT D. GROSS
E. E. JACOBSON
R. H. MARTINDALE
C. D. MOON
REEVES NEWSOM
H. V. PEDERSEN
GEO. W. PRACY
EDW. H. RUEHL
F. ALBERT SCHAEFER
R. J. SMITH

This committee is charged with the review and recommendation for publication of specifications for copper, iron (wrought or cast), lead (etc.) tubing or pipe in sizes and weights suitable for water service lines.

The committee may also, to a limited extent, review and summarize current methods of installation of service lines.

### *Committee 7T—Recommended Standards for Threads for Underground Service Line Fittings*

WM. W. BRUSH, *Chairman*

Organization of this committee has been suspended until expiration of wartime emergency restrictions on water works materials. The committee's assignment will be the development of standard specifications or minimum requirements for threads for underground service line fittings.

### *Committee 7V—Recommended Design for Valve Boxes and Covers, Curb Stop Boxes and Covers, and Meter Boxes and Covers*

FRANK C. AMSBARY, JR., *Chairman*
SIDNEY S. ANTHONY
T. J. BLAIR, JR.
HUGH J. CARROLL
EDGAR W. JOHNSON
F. A. SCHAEFER
F. J. VEALE
M. B. WHITAKER

This committee is charged with the development of recommended design for valve boxes and covers, curb stop boxes and covers, and meter boxes and covers.

### COMMITTEE 8—VALUATION AND DEPRECIATION

LOUIS R. HOWSON, *Chairman*
CHAS. J. ALFKE
JOHN S. LONGWELL
DALE L. MAFFITT
N. T. VEATCH
ABEL WOLMAN

This committee was organized in January 1944. Its immediate assignment is the consideration of the National Association of Railroad and Utilities Commissioners report on depreciation. A statement of the committee was published in the June 1944 JOURNAL.

### COMMITTEE 9—RATES

### COMMITTEE 10—WATER CONSUMPTION

## WATER PURIFICATION DIVISION COMMITTEES

The editorial group appointed to revise the "Manual of Water Quality and Treatment" was organized under the direction of the Chairman of the Water Purification Division early in 1944. The personnel of that group is listed under Water Works Practice Committees—Committee 5—Manual of Water Quality and Treatment.

### WATER PURIFICATION DEVELOPMENT COMMITTEE

The officers of the Water Purification Division plus an Executive Officer constitute the Committee on Water Purification Development.

The duty of this committee is to define the subject and extent of any special studies or reports deemed desirable and consistent with the purposes of the Water Purification Division.

The Secretary of the Water Purification Division (ex officio) is a member of the Association's Committee on Water Works Practice.

## COMMITTEE ON SPECIFICATIONS AND TESTS FOR WATER PURIFICATION CHEMICALS

The activities of this committee have been suspended for the duration.

## COMMITTEE ON SPECIFICATIONS FOR AND METHODS OF TESTING ZEOLITES

D. E. DAVIS, *Chairman*
GEO. D. NORCOM
H. M. OLSON
S. T. POWELL
M. C. SCHWARTZ
M. J. SHOEMAKER

*Technical Advisory Committee*

A. S. BEHRMAN
E. S. HERTZOG
F. K. LINDSAY
EDW. R. MUELLER
O. J. RALSTON
H. L. TIGER

A Tentative Manual of Zeolite Test Procedures was published in the June 1943 JOURNAL. The test as it stands is only a partial coverage of the group of exchange materials and the work of the committee is to continue.

## COMMITTEE ON PERMISSIBLE LOADINGS AND CAPACITIES OF WATER TREATMENT PLANTS

DOUGLAS FEBEN, *Chairman*
A. CLINTON DECKER
E. B. EVANS
JAMES E. KERSLAKE
VANCE C. LISCHER
GEO. A. MCBRIDE
ARTHUR F. MELLEN
CHAS. H. SPAULDING
PAUL WEIR

This committee is charged with the consideration of the scope of the applicability of short-time preparation for filtration; and of high-rate filtration to water treatment processes. The committee is actively at work and a final report is scheduled to be presented at the 1945 Annual Conference of the Association.

## COMMITTEE ON WATER CONDITIONING METHODS TO INHIBIT CORROSION

The activities of this committee have been suspended for the duration.

## COMMITTEE ON SPECIFICATIONS FOR FILTERING MATERIALS

RICHARD HAZEN, *Chairman*

This committee's Tentative Standard Specifications were published in the April 1943 JOURNAL. Further activities of the committee have been suspended for the duration.

## COMMITTEE ON BIOLOGICAL AND CHEMICAL PROBLEMS OF WATER DISTRIBUTION SYSTEMS

This committee is being organized. Its duties will be to collect data relative to the effect of chemical and biological phenomena on the quality of water in distribution systems and on the pipes and appurtenances comprising distribution systems.

# FINANCE AND ACCOUNTING DIVISION COMMITTEES

## COMMITTEE ON JOINT ADMINISTRATION AND COLLECTION OF WATER AND SEWER ACCOUNTS

L. N. THOMPSON, *Chairman*
L. G. LENHARDT
WM. PIATT
W. F. TEMPEST
J. B. WINDER

The duties of this committee include collecting information concerning joint administrative and collection policies and recommending procedure or methods.

## COMMITTEE ON A FAIR BASIS FOR COMPARISON OF WATER RATES

This committee is to be organized.

# JOINT COMMITTEES WITH OTHER ORGANIZATIONS

## JOINT EDITORIAL COMMITTEE ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND SEWAGE

*AMERICAN PUBLIC HEALTH ASSOCIATION*
*AMERICAN WATER WORKS ASSOCIATION*

*Representatives of A.W.W.A.*

WILLIAM D. HATFIELD
HARALD A. LEVERIN
M. C. SCHWARTZ

*Representatives of A.P.H.A.*

JOHN F. NORTON, *General Chairman*
ARTHUR M. BUSWELL
WALTER L. MALLMANN

This committee performs the editorial work and makes all arrangements for the publication of "Standard Methods." An eighth edition of this book was issued in 1936. The ninth edition of this text is now in preparation.

## JOINT RESEARCH COMMITTEE ON BOILER FEEDWATER STUDIES

*AMERICAN BOILER MANUFACTURERS ASSOCIATION*
*AMERICAN RAILWAY ENGINEERING ASSOCIATION*
*AMERICAN SOCIETY OF MECHANICAL ENGINEERS*
*AMERICAN SOCIETY FOR TESTING MATERIALS*
*AMERICAN WATER WORKS ASSOCIATION*
*EDISON ELECTRIC INSTITUTE*

*Representatives of A.W.W.A.*

HARRY E. JORDAN
SHEPPARD T. POWELL

This committee plans and controls research on certain problems associated with boiler feedwater. It is composed of an executive sub-committee and nine technical sub-committees. Except for annual meetings of the Executive Committee, this committee has suspended its activities for the duration.

The secretary is J. B. Romer, Chief Chemist, The Babcock & Wilcox Co., Barberton, Ohio.

## AMERICAN CO-ORDINATING COMMITTEE ON CORROSION

*Representatives of A.W.W.A.*

HARRY E. JORDAN
H. LLOYD NELSON, *Alternate*

This committee includes representatives of twenty associations. It is organized for the purpose of correlating research regarding corrosion. The chairman is R. B. Mears. The secretary is Geo. H. Young, 4400 Fifth Avenue, Pittsburgh, Pa.

## JOINT COMMITTEE ON CONSTRUCTION CONTRACTS

*Representative of A.W.W.A.*

L. G. LENHARDT

This committee was engaged in a review and revision of the standard form of construction contract. The work is under the guidance of the Associated General Contractors of the U. S. Work has been suspended during the war emergency.

## AMERICAN RESEARCH COMMITTEE ON GROUNDING

*AMERICAN WATER WORKS ASSOCIATION*
*EDISON ELECTRIC INSTITUTE*

*Representatives of A.W.W.A.*

M. WARREN COWLES
CHAS. F. MEYERHERM
E. E. MINOR

This committee was formed in order to investigate and report upon the various questions involved in the grounding of electrical circuits on water, gas and drainage piping. The general chairman of this committee is H. S. Warren, 18 Brunswick Road, Montclair, N. J. The secretary-treasurer is Chas. F. Meyerherm. (See page 142 for report available.)

## COMMITTEE ON WATER WORKS TERMS

*AMERICAN PUBLIC HEALTH ASSOCIATION*
*AMERICAN SOCIETY OF CIVIL ENGINEERS*
*AMERICAN WATER WORKS ASSOCIATION*

THORNDIKE SAVILLE, *General Chairman* REGINALD C. PRICE, *Secretary*

*Representatives of A.W.W.A.*

THORNDIKE SAVILLE, *Chairman*
H. E. BABBITT
SAMUEL B. MORRIS

*Representatives of A.P.H.A.*

EARLE B. PHELPS, *Chairman*
SOL PINCUS
R. E. TARBETT

*Representatives of A.S.C.E.*

O. E. BROWNELL, *Chairman*
R. S. TYLER
ARTHUR D. WESTON

This committee has been organized to formulate the definitions of various terms used in the practice of water works engineering and operation. Preparations are being made for publication of this document.

## COMMITTEE ON WATER WORKS ACCOUNTING MANUAL

*AMERICAN WATER WORKS ASSOCIATION*
*MUNICIPAL FINANCE OFFICERS ASSOCIATION*

*Representatives of A.W.W.A.*

HAL F. SMITH, *Chairman*
J. C. FLANAGAN
M. F. HOFFMAN

This committee is responsible for the preparation of future editions of the "Manual of Water Works Accounting," which document was first published in 1938 (see page 139).

## JOINT COMMITTEE ON WATER HAMMER

*Representatives of A.W.W.A.*

F. M. Dawson
L. H. Kessler

This committee was organized in 1931 under the Hydraulic Division of the A.S.M.E. S. Logan Kerr is general chairman. A symposium on water hammer was presented in 1933. A second symposium on the subject was held at the December 1937 meeting of A.S.M.E. The committee has a very broad international representation, but has been inactive during the war emergency.

## JOINT COMMITTEE ON SPECIFICATIONS FOR FIELD WELDING OF STEEL WATER PIPE JOINTS

*AMERICAN WATER WORKS ASSOCIATION*
*AMERICAN WELDING SOCIETY*

Wm. W. Hurlbut, *Chairman*

*Representatives of A.W.W.A.*

Robt. B. Diemer
G. W. Hamlin
Robt. C. Kennedy
L. G. Lenhardt
H. Arthur Price

*Representatives of A.W.S.*

H. C. Boardman
H. M. Chadwick
M. Ettington
G. H. Garrett
H. O. Hill

This joint committee was organized in 1942 to develop Specifications for Field Welding of Steel Water Pipe Joints. Final draft of the document is now in circulation within the committee.

## COMMITTEE ON SURVIVAL AND RETIREMENT EXPERIENCE WITH WATER WORKS FACILITIES

*AMERICAN WATER WORKS ASSOCIATION*
*INSTITUTE OF WATER SUPPLY UTILITIES*

Louis R. Howson, *Chairman*
J. Walter Ackerman
Herbert H. Brown
John B. Dean
Nelson A. Eckart
John C. Flanagan
Harry U. Fuller
Carl A. Eberling
Geo. F. Hughes
H. H. Hyman
Edgar P. Kable
Paul M. Kydd
L. G. Lenhardt
W. E. MacDonald
Dale L. Maffitt
Samuel B. Morris
Ben S. Morrow
John H. Murdoch, Jr.
Reeves Newsom
B. E. Payne
Walter Moffat Scott
Leon A. Small
M. C. Smith
H. A. Van Norman
Thos. H. Wiggin

*Supervising Co-ordinator*, E. H. Aldrich

*CO-OPERATING COMMITTEE OF*
*NEW ENGLAND WATER WORKS ASSOCIATION*

Reeves Newsom, *Chairman*
Harry U. Fuller
Arthur V. Ruggles
Thos. H. Wiggin

This committee was organized early in 1941 to secure accurate and comprehensive data relating to the survival and retirement history of the various main elements of water works facilities in typical plants in the United States and Canada for the purpose of assisting in planning, financing, designing, managing and operating such facilities.

Latest report of the committee published in the August 1944 JOURNAL. (See reference to Valuation and Depreciation Committee under Water Works Practice Committees—Committee 8.)

### STEEL STANDPIPES AND ELEVATED TANKS

*AMERICAN WATER WORKS ASSOCIATION*
*AMERICAN WELDING SOCIETY*
*NEW ENGLAND WATER WORKS ASSOCIATION*

LOUIS R. HOWSON, *Chairman*

*Representatives of A.W.W.A.*

H. O. HILL
JOS. P. SCHWADA
N. T. VEATCH

*Representatives of A.W.S.*

H. C. BOARDMAN
J. O. JACKSON
C. W. OBERT
H. A. SWEET

*Representatives of N.E.W.W.A.*

HARRY U. FULLER
HENRY E. HALPIN
GEO. A. SAMPSON

This committee at present is charged with the development of specifications for paints and painting of elevated tanks. (See page 141 for specifications published.)

## A.W.W.A. REPRESENTATIVES ON COMMITTEES OF OTHER ORGANIZATIONS

### U. S. BUREAU OF STANDARDS

*Simplified Practice Committee on Wrought-Iron and Wrought-Steel Pipe, Valves and Fittings*

*Representative of A.W.W.A.*

H. ARTHUR PRICE

### COMMITTEES UNDER THE PROCEDURE OF THE AMERICAN STANDARDS ASSOCIATION

*A21—Specifications for Cast-Iron Pipe and Special Castings*

*AMERICAN GAS ASSOCIATION*
*AMERICAN SOCIETY FOR TESTING MATERIALS*
*AMERICAN WATER WORKS ASSOCIATION*
*NEW ENGLAND WATER WORKS ASSOCIATION*

*Representatives of A.W.W.A.*

THOMAS H. WIGGIN, *General Chairman*
FRANK A. BARBOUR
WILLIAM W. BRUSH
L. G. LENHARDT
REEVES NEWSOM

As noted above, T. H. Wiggin (A.W.W.A.) is the general chairman of the committee. The secretary is C. C. Simpson, Jr., (A.G.A.), 4 Irving Place, New York, N. Y. (See page 140 for specifications published.)

## *A35—Manhole Frames and Covers*

*AMERICAN SOCIETY OF CIVIL ENGINEERS*
*THE TELEPHONE GROUP (BELL SYSTEM AND U. S. IND. TEL. ASSN.)*

*Representative of A.W.W.A.*

FRANK A. MARSTON

This committee is co-operating with the Division of Simplified Practice (U. S. Dept. of Commerce) in the standardization of design, material and dimensions of manhole frames and covers. The temporary chairman is S. C. Miller, Bell Telephone Labs., 463 West Street, New York, N. Y.

American Standards for Manhole Frames and Covers for Sub-Surface Structures was accepted by the American Standards Association in 1941 as document A35.1—1941. The document was published in the July 1942 JOURNAL.

## *A40—Standardization of Plumbing Equipment*

*AMERICAN SOCIETY OF MECHANICAL ENGINEERS*
*AMERICAN PUBLIC HEALTH ASSOCIATION*

*Representative of A.W.W.A.*

F. M. DAWSON
WARREN J. SCOTT, *Alternate*

This committee is charged with the development of a standard plumbing code as well as specifications for certain materials used in plumbing. The acting secretary is C. B. LePage, Asst. Secy., American Society of Mechanical Engineers, 29 W. 39th Street, New York, N. Y.

## *B2-1919—Pipe Thread*

*AMERICAN GAS ASSOCIATION*
*AMERICAN SOCIETY OF MECHANICAL ENGINEERS*

*Representative of A.W.W.A.*

WILLIAM W. BRUSH

The general chairman of this committee is Alten S. Miller (A. G. A.), 80 Westcott Rd., Princeton, N. J.

## *B16—Pipe Flanges and Fittings*

*AMERICAN SOCIETY OF MECHANICAL ENGINEERS*
*HEATING, PIPING AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION*
*MANUFACTURERS STANDARDIZATION OF THE VALVE AND FITTINGS INDUSTRY*

*Representatives of A.W.W.A.*

FRANK A. BARBOUR
WILLIAM W. HURLBUT

The general chairman of this committee is Collins P. Bliss (A.S.M.E.), Pres., Engineering Index, Inc., 29 W. 39th Street, New York, N. Y.

## *B31—Code for Pressure Piping*

*AMERICAN SOCIETY OF MECHANICAL ENGINEERS*

*Representative of A.W.W.A.*

H. ARTHUR PRICE

The general chairman of this committee is Edwin B. Ricketts, Consolidated Edison Co., 4 Irving Pl., New York, N. Y.

## *B36—Standardization of Dimensions and Materials of Wrought-Iron and Wrought-Steel Pipe and Tubing*

*AMERICAN SOCIETY OF MECHANICAL ENGINEERS*
*AMERICAN SOCIETY FOR TESTING MATERIALS*

*Representative of A.W.W.A.*
H. ARTHUR PRICE

The general chairman of this committee is Harold H. Morgan (A.S.T.M.), 2200 Insurance Exchange Bldg., Chicago, Ill.

## *C1—National Electrical Code*

*NATIONAL FIRE PROTECTION ASSOCIATION*

*Representative of A.W.W.A. on Sub-Committee on Grounding*
CHARLES F. MEYERHERM

The general chairman of this committee is A. R. Small, 207 E. Ohio Street, Chicago, Ill.

## *G8—Specifications for Zinc Coating of Iron and Steel*

*AMERICAN SOCIETY FOR TESTING MATERIALS*

*Representative of A.W.W.A.*
PAUL WEIR

The acting chairman of this committee is C. D. Hocker, Bell Telephone Labs., Murray Hill, N. J.

## *Z10—Letter Symbols and Abbreviations for Science and Engineering*

*AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE*
*AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS*
*AMERICAN SOCIETY OF CIVIL ENGINEERS*
*SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION*
*AMERICAN SOCIETY OF MECHANICAL ENGINEERS*

*Representative of A.W.W.A.*
W. L. MALCOLM

The general chairman of this committee is Prof. H. M. Turner, Yale University; and the secretary is H. W. Samson, 1185 Hyland Park Road, Schenectady, N. Y.

Nine documents of the Z-10 series have been accepted by the American Standards Association.

## *Z23—Specifications for Sieves for Testing Purposes*

*AMERICAN SOCIETY FOR TESTING MATERIALS*
*BUREAU OF STANDARDS (U. S. DEPT. OF COMMERCE)*

*Representative of A.W.W.A.*
GORDON M. FAIR

The general chairman of this committee is L. T. Work (A.S.T.M.), Metal & Thermit Corp., Rahway, N. J.

Standard Specifications for Sieves for Testing Purposes have been published as A.S.A. document Z23.1—1939.

### *Z32—Standardization of Graphical Symbols for Use on Drawings*

*AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS*
*AMERICAN SOCIETY OF MECHANICAL ENGINEERS*

*Representative of A.W.W.A.*

W. VICTOR WEIR

The general chairman of this committee is H. W. Samson (A.I.E.E.), 1185 Hyland Park Road, Schenectady, N. Y.

Five documents of the Z32 series on Graphical Symbols have been published by the American Standards Association.

## COMMITTEES OF THE NATIONAL FIRE PROTECTION ASSOCIATION

### *Electrical Code Committee*

See Committee C1 of the American Standards Association, above. These are identical committees.

### *Committee on Forests*

*Representative of A.W.W.A.*

E. E. MINOR

Fire protection and prevention for summer homes in forested areas.

### *Committee on Hydrants, Valves and Pipe Fittings*

*Representative of A.W.W.A.*

FRANK A. BARBOUR

### *Committee on Public Water Supplies for Private Fire Protection*

*Representative of A.W.W.A.*

C. J. ALFKE

Includes the uniform marking of fire hydrants.

### *Committee on Tanks*

*Representative of A.W.W.A.*

LOUIS R. HOWSON

## INTER-ASSOCIATION COMMITTEE

### *Committee on Water and Sewage Works Development*

ABEL WOLMAN, *Chairman*

HARRY E. JORDAN, *Secretary*

*Representatives of A.W.W.A.*

SAMUEL B. MORRIS
HARRY E. JORDAN

*Representatives of F.S.W.A.*

C. A. EMERSON
G. J. SCHROEPFER

*Representatives of N.E.W.W.A.*

E. SHERMAN CHASE
ROGER W. ESTY

*Representatives of W. & S.W.M.A.*

C. H. BECKER
C. A. MCGINNIS

A joint committee organized on a temporary basis to promote planning of water and sewage works.

# CONSTITUTION AND BY-LAWS

of the

# AMERICAN WATER WORKS ASSOCIATION

*with*

## TENTATIVE STANDARDIZATION PROCEDURE

American Water Works Association, Inc.
500 Fifth Avenue New York 18, N. Y.

# CONSTITUTION AND BY-LAWS
# of the
# AMERICAN WATER WORKS ASSOCIATION
**(*Incorporated*)**

*(Adopted June 25, 1929, with amendments to June 16, 1944)*

## CONSTITUTION

### ARTICLE I

***Name***

The name of this Association shall be—The American Water Works Association.

*(Constitution)*

### ARTICLE II

The object of this Association shall be the advancement of knowledge of the design, construction, operation and management of water works, and its membership shall consist of persons interested in such matters, having such qualifications and classifications as shall be from time to time prescribed in the By-Laws.

*(Constitution)*

### ARTICLE III

***Board of Directors***

SECTION 1. The Governing Body of the Association shall be a Board of Directors, hereinafter called the Board.

SECTION 2. The Board shall consist of:

*a.* The President of the Association.

*b.* The Vice-President of the Association.

*c.* The Treasurer of the Association.

*d.* One Director to be elected by each Section of the Association.

*e.* Three Directors to be elected by the Water and Sewage Works Manufacturers Association.

*f.* The latest living Past President of the Association.

*g.* The Chairman of the Committee on Water Works Practice.

*h.* The Chairman of the Publication Committee.

SECTION 3. The terms of Directors and Officers shall start at the begin-

ning of the last day of the annual convention held subsequent to the date of their election. If, for any reason, a Director is not elected until after the date of the holding of the annual convention at which he should have commenced his term of office, his term of office shall begin at the date that the advice of his election is received by the Secretary. The terms of Directors and Officers shall terminate at the beginning of the last day of the annual convention in the year of expiration of their terms of office.

If, for any reason, the annual convention of the Association is not held between January 1, and July 1, in any year, then the terms of newly elected Directors and Officers shall commence on July 1, of such year; and the terms of office of the Directors and Officers who are to be succeeded shall terminate on that date.

SECTION 4. The President of the Association, the Vice-President of the Association and the Directors elected by the Sections of the Association and by the Water and Sewage Works Manufacturers Association will not be eligible for reëlection for consecutive terms.

SECTION 5. The Officers of the Association shall be the Officers of the Board.

SECTION 6. The functions of the Board shall include the following:

*a.* Establishing policies for the Association, and for the Executive Committee, and for the Officers.

*b.* Providing for the general administration of the affairs and property of the Association.

*c.* Fixing the time and place of the annual and other conventions of the Association as provided in the By-Laws.

*d.* Preparing and enforcing for the conduct of the business of the Association, By-Laws not in conflict with this Constitution, and amending the same.

SECTION 7. The Board may exercise the above described functions either in session at stated or duly called meetings or by letter ballot. Any matter that requires action by the Board of Directors at a time not conveniently related to a regular or called meeting may be submitted to it for approval by letter ballot.

The Board may, by resolution, designate categories of Association business which may be submitted to it by letter ballot. Matters not thus designated may be considered by the Executive Committee in the exercise of its stated duties (By-Laws, Article IV), or the Executive Committee may refer such matters to the Board for approval by letter ballot. Such action by the Executive Committee may be taken either at a meeting of the committee or by a letter ballot of the committee, if the initiation of said letter ballot is directed by the President in a letter addressed to the Secretary. Except as otherwise provided by resolution of the Board, matters submitted to it by letter ballot shall obtain an affirmative recorded vote of two-thirds of the Board membership to secure approval. The results of all letter ballots shall be reported to the Board at its next meeting.

SECTION 8. A quorum of the Board shall consist of a majority of its members.

SECTION 9. Regular meetings of the Board shall be held during the annual convention of the Association, on such days as may be decided by the Board. Other meetings may be held at the direction of the President, or at the re-

quest, in writing, of five members of the Board, and on such notice as shall be provided in the By-Laws.

SECTION 10. No Board Member may be represented in any action required of him as a Board Member by any other person; nor may he vote, by letter, upon any matter scheduled for consideration at a duly called meeting of the Board.

(*Constitution*)

## ARTICLE IV

### *Nomination and Election of Officers and Directors*

SECTION 1. There shall be a meeting of the Board held in January of each year at which a Nominating Committee consisting of the Directors representing the various Sections of the Association shall meet under the Chairmanship of the President, and shall nominate one, and may nominate two candidates for each of the offices of President, Vice-President, and Treasurer, provided that any candidate so nominated shall be an Active Member of the Association, and shall have been a member of the Executive Committee prior to the adoption of the present Constitution and By-Laws, or a member of the Board of Directors since its adoption, and shall signify willingness to accept the nomination. This Committee shall report its list of nominees to the Board before the close of its January meeting, and the list shall then be mailed to the membership before February first of that year.

At any time prior to noon on the first day of March of each year additional nominations may be made by request to the Secretary, signed by at least twenty-five Active Members, and upon receipt of such request, the Secretary shall, after acceptance of the nomination by the candidates, add such names to the ballot prepared by him. The nominees of the Nominating Committee shall be so designated on the ballot for each office, and the names of all nominees shall be arranged in alphabetical order.

When more than one name is nominated for either office, the election shall be by letter ballot. Each Active Member shall be entitled to vote for one candidate for the office of President, one candidate for the office of Vice-President, and one candidate for the office of Treasurer. The ballot shall be prepared by the Secretary and mailed to each Active Member of the Association prior to April first in each year, and shall state the name and residence of each candidate.

The ballot shall be sealed separately in a special ballot envelope, and the latter shall be enclosed in a larger envelope, and mailed to the Secretary. The signature of the member voting shall appear on the outer envelope.

When a letter ballot is necessary, the Secretary together with two or more Tellers appointed by the President shall meet at a time and place directed by the President, and shall open and count all ballots cast by persons entitled to vote. No ballot shall be counted if received later than noon of the seventh day previous to the beginning of the annual convention of the Association. When only one candidate is placed in nomination for each office to be filled, the report of the Nominat-

ing Committee shall be considered as an election.

The report of the Tellers for the election of the incoming President, Vice-President, and Treasurer shall be declared by the President at the annual convention on certificates of the Tellers. The candidates who shall have received the highest number of votes cast for the several offices shall be declared elected. If there be a tie vote the President shall order a ballot to be taken at the annual convention to decide which of the candidates who have received the same number of ballots shall be chosen.

SECTION 2. The terms of the Officers so elected shall commence at the beginning of the last day of the annual convention, following the date of their election; and shall cease at the beginning of the last day of the next annual convention. But, if an annual convention is not held prior to July 1, that date will be the date of the beginning of the term of office of an officer. Said term shall be for approximately one year, but shall continue until a successor has been chosen.

In case of a vacancy in the office of President, the Vice-President shall act in his place for the unexpired term. In case the Vice-President cannot act, the latest living Past President shall do so.

In the case of a vacancy in the office of Treasurer, the Executive Committee shall appoint an Active Member to fill the office for the unexpired term.

SECTION 3. One Director to represent each Local Section shall be nominated and elected by the members of the Section at an annual Section meeting, and in the same manner as the Presiding Officer of that Section is elected. The manner of such election shall receive the approval of the Board. The Director so elected shall be an Active Member and shall reside in the territory of the Section at the time of his election. Should he cease to reside in the territory of the Section before his term of office is ended, it shall be within the power of the Section to replace him.

The term of each Director so elected shall be for approximately three years, beginning with the last day of the annual convention immediately following his election, or on the following July 1. When a new local Section is established, the initial term of the Director representing such Section shall be as determined by the Board.

In the case of the retiring, from any cause, of a Director representing a Section, before his term is completed, the governing body of the Section shall designate his successor, who shall serve for the unexpired portion of the term.

SECTION 4. Three Directors shall be nominated and elected by the Water and Sewage Works Manufacturers Association. The term of each Director shall be for three years beginning with the last day of the annual convention immediately following his election, or on the following July 1.

In the case of the retiring, from any cause, of a Director representing the Water and Sewage Works Manufacturers Association before his term is completed, the governing body of the Water and Sewage Works Manufacturers Association shall designate his successor who shall serve for the unexpired portion of the term.

(*Constitution*)

## ARTICLE V

### *Amendments*

Proposals to amend this Constitution shall be submitted in writing to the Board, signed by at least ten Active Members of the Association.

The Board shall consider the proposals, and the proposers shall be notified of the Board's opinion in regard thereto not later than the first day of March.

The proposers may then withdraw their proposals, accept any change suggested, or insist on the original form, sending their decision to the Secretary not later than the first day of April.

The proposals, as accepted by the proposers, shall be mailed to the Active Members not less than twenty-one days before the annual convention.

Proposals to amend this Constitution may also be made by the Board and shall be mailed to the Active Members not less than twenty-one days before the annual convention.

All proposals shall be submitted for discussion at the annual convention.

The Active Members there present may propose an amendment or amendments thereto, and all proposals together with any such amendment or amendments shall be printed on a letter ballot to be submitted to the Active membership.

The Secretary shall issue the letter ballot not later than two months after the annual convention.

On the written request of three or more members the letter ballot shall be accompanied by a statement giving reasons for and against the proposal edited by a Committee appointed by the Board, consisting of an equal number of members favoring and members opposing the proposal.

The letter ballot shall be returnable to the Secretary not later than three months after the annual convention. Three Tellers appointed by the Board shall forthwith count the ballots and report the result to the Board.

An affirmative two-thirds of all valid ballots shall be necessary for the amendment or repeal of any part of the Constitution.

The amendments as passed shall take effect at the beginning of the next calendar year except that changes affecting the tenure of office of an Officer of the Association shall not take effect until the next annual convention.

# BY-LAWS

## ARTICLE I

### *Membership*

SECTION 1. The membership of the Association shall consist of Honorary, Active, Corporate, Associate, Junior Members and Affiliates.

SECTION 2. An Honorary Member shall be one whose practical or scientific knowledge in matters relating to water supply, and whose accomplishments in that field of endeavor shall entitle him to special recognition by the Association. Honorary Members shall have the same privileges as Active Members but shall not be required to pay any dues for the support of the Association.

SECTION 3. An Active Member shall be a superintendent, a manager, an official or employee of a municipal or private water works; a civil, mechanical, hydraulic, or sanitary engineer, a chemist, a bacteriologist, or any qualified person engaged or interested in the advancement of knowledge relating to water supplies.

SECTION 4. A Corporate Member shall be a Water Board, Water Commission, Water Department, Water Company or Corporation, National, State or District Board of Health, or other body, corporation or organization engaged or interested in water supply work, and shall be entitled to one representative whose name shall appear on the roll of members and who shall have all the rights and privileges of an Active Member. This representative may be changed at the convenience and pleasure of the Corporate Member on written notice to the Secretary.

SECTION 5. An Associate Member shall be either a person, firm or corporation engaged in manufacturing or furnishing supplies for the operation, construction, or maintenance of water works.

SECTION 6. A Junior Member shall be an employee of a municipal or private water works; a civil, mechanical, hydraulic, or sanitary engineer, a chemist, a bacteriologist, a student or any otherwise qualified person engaged or interested in the advancement of knowledge relating to water supplies. At the time of his admission he shall be not less than eighteen years of age. His connection with the Association shall cease when he becomes twenty-five years of age, unless he is regularly enrolled as a student in a university or has previously transferred to the grade of Active Member. Junior Members shall receive the Journal and all privileges of Active membership except holding office and voting.

SECTION 7. An Affiliate shall be any person otherwise qualified for Active membership who, at the time of application, is not nor previously has been a member of the Association, and who, for acceptable reasons, does not wish to become an Active Member.

No corporation, firm or partnership which otherwise would be entitled to the grades of Associate or Corporate Member may hold the grade of Affiliate. No employee of an Associate Member may become an Affiliate. No person who is the Superintendent, the Manager, the Chief Engineer, the Superintendent of Filtration, the Chief Chemist or the Superintendent of Distribution in a plant having more than 3000

active services, is eligible for the grade of Affiliate. Under unusual conditions, exception to the above may be made by action of the Executive Committee if the applicant sets forth fully the reasons for the exception when applying for the Affiliate grade.

Affiliates shall not be entitled to vote upon general Association questions, and not eligible to hold office in the Association, nor in any of its Divisions. They shall be eligible to vote upon Section questions and to hold Section offices except those of Chairman, Vice-Chairman, Secretary (and/or Treasurer). They shall be entitled to all other rights and privileges of Active Members.

(*By-Laws*)

## ARTICLE II

### *Admission and Expulsion*

SECTION 1. The Board, on its own initiative, or at the request of twenty-five members of the Association, may elect any qualified person an Honorary Member. This election shall take place at a regular meeting of the Board and shall be by ballot. Two negative ballots shall exclude.

Each Honorary Member shall receive an engrossed certificate of membership in that grade.

SECTION 2. Applications for Active, Corporate, Associate, or Junior membership and for the Affiliate grade shall be made on the blank forms provided by the Association. Each application shall embody a concise statement of the applicant's qualification for membership. All applications shall be forwarded to the Secretary who shall submit them to the Board.

An affirmative vote of a majority of the Board shall elect and the applicant shall become a member when his annual dues shall have been paid.

Affiliates may transfer to the grade of Active Member by application therefor and upon approval of the Secretary.

SECTION 3. No member whose dues are in arrears for four months shall receive the publications of the Association until such arrears are paid. Members in arrears for one year shall be automatically dropped by the Secretary from the list of members.

SECTION 4. The Board may, for sufficient cause, temporarily or permanently excuse from the payment of annual dues, any member who from ill health, advanced age, or other good reason, is unable to pay such dues, and the Board may remit the whole or part of dues in arrears, or accept in lieu thereof desirable additions to the library or collections.

SECTION 5. A member who has been dropped for nonpayment of dues may be reinstated by the Board on payment of the arrears. He shall then be entitled to receive such back numbers of the publications of the Association as may have been withheld from him on account of nonpayment of dues, and are available for distribution.

SECTION 6. Any member of any grade may be expelled from membership in the Association, by a three-quarters vote of the Board, taken by letter ballot, provided such member has been given a written statement of the charges preferred, and has been accorded an opportunity of a hearing before the Board.

SECTION 7. Any member may retire from membership by giving written notice to the Secretary, provided that he is in good standing.

(*By-Laws*)

## ARTICLE III

### *Fees and Dues*

SECTION 1. Each Active Member shall pay annual dues of ten dollars, provided that any Active Member in good standing who has paid dues continuously for thirty years shall be exempt from payment of further dues. No initiation fee shall be required from a member in good standing of an Affiliate Association or Society, who has been elected as an Active Member.

SECTION 2. Each Corporate Member shall pay annual dues of fifteen dollars.

SECTION 3. Each Associate Member shall pay annual dues of twenty-five dollars.

SECTION 4. Each Junior Member shall pay annual dues of five dollars.

SECTION 5. Each Affiliate shall pay annual dues of four dollars.

SECTION 6. The fiscal year of the Association shall begin on January first, and terminate on December thirty-first. Annual dues shall be payable in advance, and shall be due on January first in each year. It shall be the duty of the Secretary to notify each member on or before December thirty-first in each year of the amount due from said member for the ensuing year.

SECTION 7. Any newly elected member shall be entitled to all of the publications of the Association that are distributed to its members during the year, or that part of the year, for which he has paid dues.

Affiliates shall receive all publications to which the members are entitled except that they shall receive four issues only of the JOURNAL per year.

(*By-Laws*)

## ARTICLE IV

### *Executive Committee*

There shall be an Executive Committee of five members consisting of the President and four Directors. This Committee shall be chosen by the Board at its meeting at the annual convention.

The President of the Association shall act as Chairman of the Committee, or in his absence, the Committee shall choose a temporary Chairman from its members, and the Secretary of the Association shall act as its Secretary.

The duties of the Committee shall be to direct the administrative work of the Association and to carry out the policies of the Board between meetings of the latter.

A quorum of the Committee shall consist of three members.

(*By-Laws*)

## ARTICLE V

### *Duties of Officers and Directors*

SECTION 1. The President shall have general supervision of the affairs of the Association, and shall preside at all conventions of the Association and meetings of the Board. In his absence he shall designate a Presiding Officer to act in his stead at such conventions or meetings. He shall be, ex-officio, a member of all Committees.

SECTION 2. The Vice-President shall assist the President in the performance of his duties, and act in his

stead when required. He shall be, ex-officio, a member of all Committees.

SECTION 3. The Board of Directors shall be the legal representatives of the Association, and as such shall have full control of the Association in regular convention. It shall make the necessary arrangements for the conventions, and shall have power to expend the funds of the Association, or to invest the same, but must not incur indebtedness beyond the funds in the hands of the Treasurer and Secretary. It shall hold a meeting during the last day, and also a meeting at least one hour before the opening session of each annual convention. Other meetings shall be held at the call of the President, or of any five members of the Board. Notice of all meetings shall be issued by the Secretary at least ten days in advance of such meetings to all members of the Board.

At the meeting on the last day of the convention, the Board shall appoint the Secretary, who shall serve until the close of the next annual convention or until his successor shall have been appointed. If no annual convention is held prior to July 1, in any calendar year, the incoming Board of Directors shall appoint the Secretary as soon after July 1 as may be found feasible by said Board.

Except as otherwise provided in the Constitution and By-Laws, all questions before the Board shall be decided by a majority vote.

SECTION 4. The Treasurer shall have charge of the funds of the Association and shall pay bills against the Association when signed by himself and the Secretary. He shall make such reports to the Board as may be necessary or as may be called for by said Board. He may, with the approval of the Board, establish a drawing account for the Secretary.

He shall be bonded at the expense of the Association, and to an amount to be determined by the Board.

He shall perform such other duties as may be assigned to him by the Board.

SECTION 5. The Secretary shall be an Active Member of the Association. It shall be his duty to attend all conventions and meetings of the Association, and of the Board, prepare the business and duly record the proceedings thereof. He shall see that all moneys due the Association are collected, and shall promptly deposit the same to the credit of the Association. He shall certify to all bills against the Association, and once each month he shall forward to each member of the Board, a financial summary of receipts and disbursements.

The Secretary shall have charge of the printing and distribution to all the members of the Proceedings and Transactions of the Association.

He shall be ex-officio, a member and Secretary of the Committee on Water Works Practice and of the Publication Committee.

He shall make such reports to the Board as may be necessary or may be called for by the Board.

He shall have charge of the books and records of the Association and shall supervise the work of all employees.

The books of the Association shall be audited annually by Certified Public Accountants, to be appointed by the Board.

He shall be bonded at the expense of the Association, and to an amount to be determined by the Board.

He shall perform such other duties as shall be assigned to him by the Board.

SECTION 6. If an Editor is appointed by the Board, he shall perform

such duties as shall be assigned to him by the Board. He shall be, ex-officio, a member of such committees as may be designated by the Board.

(*By-Laws*)

## ARTICLE VI

### *Conventions of the Association*

The annual convention of the Association shall be held at a time and place to be selected by the Board. Additional conventions of the Association may be held at such times and places as may be selected by the Board. Meetings of the Sections shall be held as determined by the Constitutions of the Sections. All conventions and meetings shall be conducted according to "Roberts Rules of Order."

Each member and guest present at any of the conventions of the Association shall pay a registration fee of such amount as may be determined by the Board.

(*By-Laws*)

## ARTICLE VII

### *Sections and Divisions*

SECTION 1. Local Sections may be established by the Board on receipt of a written request to that effect signed by twenty Active or Corporate Members of the Association residing in the territory within which the Local Section is desired. The territory embraced by each Local Section shall be fixed by the Board.

SECTION 2. National Divisions consisting of superintendents, engineers, chemists, bacteriologists, and accountants or other classes of persons included in the membership of the Association may be established by the Board on the request of thirty members. Any member of the Association may register in any National Division of the Association in which he is interested.

SECTION 3. Such Local Sections and National Divisions which shall consist only of members of this Association in good standing shall elect their own Officers and Committees, and may make any rules for their government not inconsistent with the Constitution and By-Laws of the Association, but these rules must first be approved by the Board.

SECTION 4. Each Local Section as soon as established, and after its rules have been approved by the Board, may with its approval annually receive from the Treasurer of the Association for local use not more than twenty-five per cent of the annual dues paid to the Association by the members of the said Local Section as shown by the books of the Association on the first day of November of each year, unless the Board increases the amount allowed to any Local Section, the amount of such increase to be determined by the Board, and to be allowed only when in the judgment of the Board the work undertaken by that Local Section is such as to be of material benefit to the Association. Unless the Board increases the amount allowed the total money received by any Local Section for any one fiscal year shall not exceed the sum of $300. Local Sections having small membership shall be entitled to receive from the Association $100 in

any one fiscal year, even though the allotted twenty-five per cent of the annual dues paid to the Association by the members of the said Local Section does not amount to $100.

Each National Division when established and its rules and Constitution have been approved by the Board, may with the approval of the Board, annually receive from the Treasurer of the Association a sum not exceeding $100 for Division expenses.

The Treasurer of each Local Section or National Division shall forward to the Secretary of the Association his application endorsed by the Presiding Officer of the Section or Division for such portions of the said sums above specified as may be needed and upon receipt of such application the Secretary shall authorize the Treasurer of the Association to pay such sums to the Treasurer of the Section or Division. These moneys may be used by the Section or Division only in payment of necessary operating expenses.

At the end of each fiscal year the Treasurer of each Section and Division shall submit a certified copy of his accounts to the Secretary of the Association, the same being itemized and showing the balance on hand of funds received from the Association which will remain to the credit of such Section or Division until such Section or Division is dissolved or the Board shall otherwise order their return to the treasury of the Association.

SECTION 5. Any member of the Association who resides in a locality which is not included in the territory embraced by an existing Local Section, may upon written request to the Board be included in the membership of any Local Section. The Secretary of the Association shall notify the Secretary of the Local Section of the enrollment of the member.

Whenever a new Local Section is formed or an existing Local Section has its territory extended which will include in its territory the locality where such member resides, he shall automatically be included in the membership of such Local Section.

SECTION 6. Any Section or Division may be dissolved by the Board for reasons which it believes are good and sufficient.

*(By-Laws)*

## ARTICLE VIII

### *Publications*

All publications of the Association shall be issued under the direction of the Board and shall be copyrighted as far as is practicable and proper.

*(By-Laws)*

## ARTICLE IX

### *Committees*

SECTION 1. A Publication Committee shall be appointed by the Board at the annual convention of the Association. It shall consist of at least five members, at large, and its Chairman shall be ex-officio a member of the Board.

It shall have control of the publications of the Association, including the programs of its conventions and shall

see that all publications and papers are edited before publication.

The Committee shall prepare rules which shall govern the preparation, presentation, acceptance, and publication of all papers and such other matters of a similar nature as the best interests of the Association may require.

SECTION 2. A Committee on Water Works Practice shall be appointed by the Board at the annual convention. It shall consist of at least five members, at large, and its Chairman shall be ex-officio a member of the Board.

Any resolution, report or publication which undertakes to establish in the name of the Association, or any of its Sections or Divisions, professional or technical standards, shall be submitted to this Committee, and it shall direct all such matters on behalf of the Association.

It shall give notice by publication to the membership of all such proposed standards and report its approval or disapproval of such to the Board.

It shall appoint such Subcommittees as it may deem necessary to carry on its work properly.

SECTION 3. The Board shall appoint such other Committees as may be necessary to carry on the work of the Association.

*(By-Laws)*

## ARTICLE X

### *Board of Directors*

The Board of Directors may amend these By-Laws in any manner not inconsistent with the Constitution by a two-thirds vote of those voting at any meeting of the Board or by sealed letter ballot, providing that a copy of such proposed amendment has been mailed by the Secretary to each member of the Board at least thirty days prior to such meeting or letter ballot.

*The above text of the Constitution and By-Laws was published in the Journal of the A.W.W.A. for August, 1943, along with a form of mail ballot. Two-thirds of the votes which had been received up to the time of the meeting of the Executive Committee on September 27, 1943 (after the constitutional interval), were affirmative. The amendments were thereupon declared adopted.*

*The amendments to the Constitution became effective January 1, 1944. The amendments affecting the tenure of office of the Association's officers became effective at the 1944 Annual Conference. Amendments to the By-Laws became effective September 27, 1943.*

# American Water Works Association

# Tentative Standardization Procedure

## 1. General Policy

1.1. The Board of Directors, as the body of elected representatives of the Association's membership, is responsible for (1) approval of the initiation of all standardization activities by any group organized to act for the Association; and (2) approval of all specifications or related documents prepared by any committee of Association Members.

1.2. The Committee on Water Works Practice is organized under the terms of Article IX Section 2 of the By-Laws:

"A Committee on Water Works Practice shall be appointed by the Board at the annual convention. It shall consist of at least five members, at large, and its Chairman shall be ex-officio a member of the Board.

"Any resolution, report or publication which undertakes to establish in the name of the Association, or any of its Sections or Divisions, professional or technical standards, shall be submitted to this Committee, and it shall direct all such matters on behalf of the Association.

"It shall give notice by publication to the membership of all such proposed standards and report its approval or disapproval of such to the Board.

"It shall appoint such Subcommittees as it may deem necessary to carry on its work properly."

1.3. The Committee on Water Works Practice may organize subcommittees to develop specifications, recommended practice documents or manuals of procedure covering any phase of water supply activity. It shall periodically report to the Board of Directors the status of all subcommittee work. Specifications or manuals prepared by subcommittees and approved by the Committee on Water Works Practice shall be submitted to the Board of Directors for approval before they are published as Association documents.

1.4. Any organized Division of the Association may, in regular meeting, recommend the organization of committees to develop specifications, recommended practice documents or manuals related to the field of interest of the Division. Such recommendations, including a definition of the scope of the proposed activity, shall be approved by the Committee on Water Works Practice before work is in-

itiated. The personnel of such committees shall be reported to the Committee on Water Works Practice and approved by it. Any organized Division of the Association shall have authority to organize committees for the conduct of Division routines and either to direct or co-ordinate research or to review existing practices within the field of interest of the Division. Such committees as do not engage in the development of specifications, recommended practice documents, or manuals of procedure, shall not be subject to the jurisdiction of the Committee on Water Works Practice.

1.4.1. When a Divisional subcommittee has completed its study, its report shall be approved by the Division in regular session or by letter ballot of the Executive Committee of the Division before it is submitted to the Committee on Water Works Practice and to the Board of Directors for approval as an Association document.

1.5. The Secretary of the Association shall act as the Secretary of the Committee on Water Works Practice.

## 2. Definition of Terms

2.1. The term "Tentative Standard" shall be applied to those specifications, methods, and definitions that have been approved by the sponsoring committee and accepted by the Association in accordance with the procedure established therefor, for publication and use preliminary to adoption as standard, thus providing opportunity for suggestion and criticism.

2.2. The term "Standard" shall be applied collectively to standard specifications, standard methods, and standard definitions that have been approved by the sponsoring committee and adopted by the Board in accordance with the procedure established therefor.

2.3. The terms "Recommended Practice" or "Manual" shall be applied to procedures, processes and methods not ordinarily subject to contract between purchaser and manufacturer.

## 3. Procedure Governing the Adoption of Standards, Recommended Practice Documents or Manuals

3.1. The procedure governing the promulgation of standards shall be as follows:

3.1.1. Acceptance of tentative standards, tentative revisions of standards, and revisions of tentative standards, and withdrawal of standards, tentative standards, and tentative revisions of standards, shall be either by action of the Board of Directors as provided in Paragraphs 3.1.2 and 3.1.3 or of the Committee on Water Works Practice as provided in Paragraph 3.1.4. Adoption of Standards or related documents shall be either by action of the Board of Directors in regular meeting or by letter ballot.

3.1.2. An affirmative vote, amounting to two thirds of the Board Members voting at a stated meeting, shall be required on all committee recommendations, except those involving immediate adoption of standards and immediate revision of standards. (For procedure on these exceptions see Paragraph 3.1.3.) These committee recommendations may be amended by an affirmative vote amounting to two-thirds of those voting, subject to approval of the revised recommendation by letter ballot of the committee. How-

ever, if the revised recommendation is rejected by the committee, the original committee recommendation shall be considered as approved by the Board and the proposed revision shall be referred to the committee for study and report at the next meeting of the Board. Committee recommendations submitted to the Board for approval by letter ballot must obtain an affirmative vote of eight-tenths of the Board Members before their approval.

3.1.3. If immediate adoption as standard is recommended, either of a proposed new standard or of a revision of an existing standard, without the usual preliminary publication as tentative, a nine-tenths rather than a two-thirds affirmative vote of Board members present and voting shall be required. In this case no amendment during the meeting shall be permitted, except with unanimous consent.

3.1.4. Committee recommendations on acceptance of tentative standards, tentative revisions of standards, and revisions of tentative standards, and on withdrawal of standards, tentative standards, and tentative revisions of standards, may also be presented between annual meetings to the Committee on Water Works Practice for consideration and approval. The Committee on Water Works Practice shall determine whether the requirements of the Association relating to committee procedure have been met and whether the committee has reached a satisfactory consensus. During consideration of the recommendation of a standing committee, representatives of the committee may be present and participate in the discussion. If the Committee on Water Works Practice takes favorable action upon the recommendation, the document shall be submitted to the Board for its approval by letter ballot.

3.2. The requirements of Sec. 3.1 shall be applicable also in the establishment of recommended practice documents or manuals of procedure.

3.3. Reports, resolutions and recommendations pertaining to or involving the use, or proposed use, in a standard or tentative standard, of any device or process which forms the subject matter of any existing patent, copyright or trade-mark, shall first be submitted to the Committee on Water Works Practice, and shall be submitted to the Board of Directors only with the approval of the Committee on Water Works Practice.

3.4. All specifications, recommended practice documents and/or manuals of procedure shall (except as provided in 3.1.3) be termed tentative when first approved by the Board. They shall, if no modifications are proposed, be termed "standard" after a period of one year. The Board of Directors shall at its stated meetings take due note of the status of tentative standards and may by two-thirds affirmative vote suspend for a stated or an indefinite period the designation of any document as "standard."

3.5. For the duration of the war, the following emergency policy is approved:

3.5.1. A special subcommittee consisting of the Chairman and Vice-Chairman of the Committee on Water Works Practice and the Secretary is authorized to consider revisions, or modifications of existing specifications or preparation of new specifications to meet conditions set up by the war emergency.

3.5.2. When the content of the text has been agreed upon by the three members of the subcommittee, the material shall be submitted by letter-ballot to the Committee on Water Works Practice and to the Board of Directors.

3.5.3. A period of two weeks shall be allowed for the filing of objections to, or acceptance of, the specifications. If a consensus of opinion develops, the material shall be issued either as (1) tentative A.W.W.A. specifications, (2) emergency specifications, or (3) an emergency wartime rider to existing specifications.

3.6. Standards or related documents prepared by joint or inter-association committees upon which the American Water Works Association has appointed a representative and for which the Association acts as co-sponsor, shall be approved by the Committee on Water Works Practice and by the Board of Directors in the manner stipulated for A.W.W.A. documents in 3.1, 3.2, 3.3 above.

3.7. Standards or related documents prepared by a committee of other associations to which committee the A.W.W.A. has been invited and to which it has appointed one or more representatives, shall not be subject to the approval routine of the A.W.W.A. Representatives upon such committees shall be appointed by the Committee on Water Works Practice and may be withdrawn from the activity at any time for cause satisfactory to the Chairman of the Committee on Water Works Practice. Such representatives shall report the activities and progress of their work to the Committee on Water Works Practice not less often than once each year. They may at any time refer to the Chairman and/or Secretary of the Committee on Water Works Practice for advice concerning, or assistance related to, the work of the committee to which they have been appointed.

*Approved by the A.W.W.A. Board of Directors, June 18, 1943.*
*Section 1.4 amended June 15, 1944.*

# A.W.W.A.
# PUBLICATIONS

**MANUAL OF WATER QUALITY AND TREATMENT.**—A 300-page *Manual* of information brought up to date from material originally published in 1925 as a part of the *Manual of Water Works Practice*. The rewriting was directed by the late Paul Hansen and the late Lewis V. Carpenter. Eleven chapters cover: Characteristics of Available Sources; Organisms in Water; Standards of Quality; Purification Occurring in Streams, Lakes and Reservoirs; Partial Treatment and Treatment Preliminary to Filtration; Coagulants and Coagulation; Chlorine and Other Chemicals; Tastes and Odors; Filtration; Chemical Conditioning of Waters; and Treatment Plant Control. The book is complete with over 50 illustrations, graphs and charts and has a complete index and bibliography. Published in 1940; reprinted in 1941. Price to A. W. W. A. Members, $2.50; to A. W. W. A. Members who send cash with order, $2.25; to non-members, $3.00.

**INDEX TO THE PROCEEDINGS, JOURNAL AND OTHER PUBLICATIONS.**—This Index covers 59 years of A. W. W. A. publications: the Proceedings for 1881 through 1913; the JOURNAL for 1914 through 1939; and other Association publications. In the 285 pp. of the book are given: a chronological listing of all published papers (grouped under 70 major subjects of the water works field); a complete author index; and a list of other publications of the A. W. W. A. and those published in co-operation with other organizations. Price to A. W. W. A. Members, $1.75; to A. W. W. A. Members who send cash with order, $1.50; to non-members, $2.00.

**MANUAL OF WATER WORKS ACCOUNTING.**—Prepared jointly by the A. W. W. A. and the Municipal Finance Officers Association, this 500-page Manual contains twenty chapters covering: Accounting Organization and Control; Accounts; Books of General Entry and Accounting Documents; Customer Accounting Procedure up to Time of Billing; Customer Billing and Bookkeeping; Purchases; Accounting for Materials and Supplies; Payroll Accounting; Accounting for Contractual Services, Interest on Notes, and Taxes; Depreciation; Distribution of Clearing Accounts; Cost Accounting; Accounting for Cash; Restricted Funds; Investments; Plant Accounting; Creditor and Ownership Equities; Preparation of Financial Statements; and Financial Policies and Planning. Published in 1938. Price, for general sales, $4.00; to A. W. W. A. Members who send cash with order, $3.20.

**STANDARD METHODS FOR THE EXAMINATION OF WATER AND SEWAGE.**—Published jointly by the A. W. W. A. and the American Public Health Association with collaboration of the American Chemical Society. Eighth Edition, 1936. Paper bound, 300 pages. Available through the American Public Health Association, 1790 Broadway, New York 19, N. Y., at $1.50. Ninth edition to be published at end of 1945.

**WATER-BORNE OUTBREAKS IN THE UNITED STATES AND CANADA AND THEIR SIGNIFICANCE.**—By Arthur E. Gorman and Abel Wolman. Published in the February 1939 JOURNAL, p. 225. This 150-page book is a unique compilation and a valuable interpretation. Published separately, $1.00.

## *Specifications for Cast-Iron Pipe, Fittings, Lining and Laying*

**AMERICAN RECOMMENDED PRACTICE MANUAL FOR THE COMPUTATION OF STRENGTH AND THICKNESS OF CAST-IRON PIPE—A.S.A. A21.1–1939.**—Adopted by the A. W. W. A. December 1939 and published as a part of the December 1939 JOURNAL. 81 pp. Reprint, 40¢.

**AMERICAN STANDARD SPECIFICATIONS FOR CAST-IRON PIT CAST PIPE FOR WATER OR OTHER LIQUIDS—A.S.A. A21.2–1939.**—Adopted by the A. W. W. A. December 1939 and published as a part of the December 1939 JOURNAL. 23 pp. Reprint, 20¢.

**AMERICAN STANDARD SPECIFICATIONS FOR CEMENT MORTAR LINING FOR CAST-IRON PIPE AND FITTINGS—A.S.A. A21.4–1939.**—Adopted by the A. W. W. A. December 1939 and published as a part of the December 1939 JOURNAL. 9 pp. Reprint, 15¢.

**STANDARD SPECIFICATIONS FOR CAST-IRON SPECIAL CASTINGS.**—The portion of the A. W. W. A. 1908 Specifications for Cast-Iron Water Pipe and Special Castings which relates to special castings has not yet been superseded by new material produced by the American Standards Association Committee A21. Until such time as this Committee completes its report A21.7, the A. W. W. A. 1908 Specifications continue to be a basis for purchase *insofar as they relate to special castings.* 36 pp. Reprint, 30¢.

**STANDARD SPECIFICATIONS FOR LAYING CAST-IRON PIPE—7D.1–1938.**—Adopted by the A. W. W. A. April 28, 1938 and published in the February 1938 JOURNAL. 20 pp. Reprint, 15¢.

## *Specifications for Steel Pipe and Coatings*

**STANDARD SPECIFICATIONS FOR RIVETED STEEL PIPE—7A.1–1940.**—Published as Tentative Specifications as a part of the January 1940 JOURNAL and adopted as Standard by the A. W. W. A. April 25, 1940. 11 pp. Reprint, 15¢.

**TENTATIVE SPECIFICATIONS FOR LOCK-BAR PIPE—7A.2–T.**—Published as Tentative Specifications as a part of the January 1940 JOURNAL and approved only as Tentative Specifications by the A. W. W. A. April 25, 1940. 12 pp. Reprint, 15¢.

**STANDARD SPECIFICATIONS FOR ELECTRIC FUSION WELDED STEEL WATER PIPE OF SIZES 30 INCHES AND OVER—7A.3–1940.**—Published as Tentative Specifications as a part of the January 1940 JOURNAL and adopted as Standard by the A. W. W. A. April 25, 1940. Emergency Alternate Provisions promulgated as of July 24, 1943, and published as part of the September 1943 JOURNAL. 20 pp. Reprint, 15¢.

**TENTATIVE REVISION (1943) OF STANDARD SPECIFICATIONS FOR STEEL WATER PIPE OF SIZES UP TO BUT NOT INCLUDING 30 INCHES—7A.4–1941–TR.**—Published as Tentative Specifications as a part of the June 1940 JOURNAL and adopted as Standard by the A. W. W. A. June 26, 1941. Tentative Revision published in the April 1943 JOURNAL. Emergency Alternate Provisions promulgated as of June 19, 1943, and published as part of the September and October 1943 JOURNALS. 28 pp. Reprint, 15¢.

**STANDARD SPECIFICATIONS FOR COAL-TAR ENAMEL PROTECTIVE COATINGS FOR STEEL WATER PIPE OF SIZES 30 INCHES AND OVER—7A.5–1940.**—Published as Tentative Specifications as a part of the January 1940 JOURNAL and adopted as Standard by the A. W. W. A. April 25, 1940. 28 pp. Reprinted under same cover as 7A.6–1940, description of which follows.

**STANDARD SPECIFICATIONS FOR COAL-TAR ENAMEL PROTECTIVE COATINGS FOR STEEL WATER PIPE OF SIZES UP TO BUT NOT INCLUDING 30 INCHES—7A.6–1940.**—Published as Tentative Specifications as a part of the January 1940 JOURNAL and adopted as Standard by the A. W. W. A. April 25, 1940. 24 pp. Reprinted under one cover with 7A.5–1940, 30¢.

**STANDARD SPECIFICATIONS FOR CEMENT-MORTAR PROTECTIVE COATING FOR STEEL WATER PIPE OF SIZES 30 INCHES AND OVER—7A.7–1941.**—Published as Tentative Specifications as a part of the January 1940 JOURNAL and adopted as Standard by the A. W. W. A. June 26, 1941. 22 pp. Reprint, 20¢.

### *Specifications for Valves, Sluice Gates and Fire Hydrants*

**STANDARD SPECIFICATIONS FOR GATE VALVES FOR ORDINARY WATER WORKS SERVICE—7F.1–1939.**—Adopted by the A. W. W. A. April 28, 1938 and published in the March 1939 JOURNAL. 15 pp. Reprint, 15¢.

**TENTATIVE SPECIFICATIONS FOR SLUICE GATES—7F.2–T.**—Approved as Tentative Specifications by the A. W. W. A. June 26, 1941 and published as a part of the October 1941 JOURNAL. 11 pp. Reprint, 15¢.

**STANDARD SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE—7F.3–1940.**—Adopted as Standard Specifications by the A. W. W. A. January 17, 1940. Includes "Characteristics of the National Standard Fire-Hose Coupling Screw Thread" and 7F.3.1–1937 (see below). Published as a part of the August 1940 JOURNAL. 12 pp. Reprint, 15¢.

**SPECIFICATIONS FOR UNIFORM MARKING OF FIRE HYDRANTS—7F.3.1–1937.**—Published in the April 1937 JOURNAL and adopted by the A. W. W. A. June 7, 1937. Included in 7F.3–1940 described above.

### *Other Specifications*

**TENTATIVE EMERGENCY SPECIFICATIONS FOR REINFORCED CONCRETE PRESSURE PIPE—7B–T.**—Approved as Tentative Specifications by the A. W. W. A. March 1943 and published as part of the April 1943 JOURNAL. 11 pp. Reprint, 15¢.

**STANDARD SPECIFICATIONS FOR ELEVATED STEEL WATER TANKS, STANDPIPES AND RESERVOIRS—7H.1–1943.**—Published as Tentative Specifications as a part of the December 1940 JOURNAL and adopted as Standard by the A. W. W. A. June 26, 1941, by the American Welding Society July 23, 1941 and by the New England Water Works Association September 28, 1943. Revised as of March 25, 1943. 35 pp. Reprint, 25¢.

**TENTATIVE RECOMMENDED PRACTICE—REPAINTING ELEVATED STEEL TANKS AND WATER STORAGE TANKS (WITH NOTES ON REPAIRS)—7H.2–T.**—Approved by the A. W. W. A. June 15, 1943 and published as part of the July 1943 JOURNAL. 7 pp. Reprint, 5¢.

**TENTATIVE SPECIFICATIONS FOR COLD WATER METERS—DISPLACEMENT TYPE—7M.1–T.**—Approved as Tentative Specifications by the A. W. W. A. November 1941 and published as Tentative Specifications in the December 1941 JOURNAL. (With Emergency Alternate Provisions issued as of December 1, 1942.) 14 pp. Reprint, 20¢.

**EMERGENCY ALTERNATE SPECIFICATIONS FOR SULFATE OF ALUMINA—1942.**—Published in the July 1942 JOURNAL. 2 pp. Reprint, 10¢.

**TENTATIVE STANDARD SPECIFICATIONS FOR FILTERING MATERIAL—5C–T.**—Approved as Tentative Specifications by the A. W. W. A. March 1943 and published as a part of the April 1943 JOURNAL. 14 pp. Reprint, 15¢.

## *Committee Reports and Recommended Practices*

**REPORT ON CHEMICAL HAZARDS IN WATER WORKS PLANTS—CHLORINE—5B.1–1935.**—Published in the September 1935 JOURNAL. 24 pp. Reprint, 20¢.

**REPORT ON CHEMICAL HAZARDS IN WATER WORKS PLANTS—AMMONIA—5B.2–1936.**—Published in the November 1936 JOURNAL. 14 pp. Reprint, 20¢.

**REPORT ON CHEMICAL HAZARDS IN WATER WORKS PLANTS—SULFUR DIOXIDE AND CAUSTIC SODA—5B.3–1939.**—Published in the March 1939 JOURNAL. 13 pp. Reprint, 20¢.

**REPORT ON SPECIFICATIONS AND TESTS FOR WATER PURIFICATION CHEMICALS—POWDERED ACTIVATED CARBON.**—Published in July 1938 JOURNAL, page 1133. Reprints not available.

**RECOMMENDED PRACTICE FOR DISTRIBUTION SYSTEM RECORDS—7G.1–1940.**—Reprint includes "Economies in Office Forms" and "Coordinating Operating System Records with Accounting Records." Published in the February 1940 JOURNAL. 60 pp. Reprint, 25¢.

**TENTATIVE MANUAL OF SAFE PRACTICE IN WATER DISTRIBUTION—7J.1–T.**—Published in the June 1942 JOURNAL. 32 pp. Reprint, 20¢.

**TENTATIVE MANUAL OF ZEOLITE TEST PROCEDURES—5Z–T.**—Approved as Tentative Specifications by the A. W. W. A. March 1943 and published as a part of the June 1943 JOURNAL. 26 pp. Reprint, 20¢.

**GROUNDING OF ELECTRIC CIRCUITS ON WATER PIPES**—Statement of A. W. W. A. Policy, Interim Report of Investigations by American Research Committee on Grounding, and Report of a Research Project on the Effects of Electric Grounding on Water Pipes, published in the April and May 1944 JOURNALS. 40 pp. Reprint, 25¢.

Certain defects were observed in
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by University Microfilms, Inc.
Since we were unable to locate a
perfect copy, this volume was
filmed as received.

University Microfilms, Inc., Ann Arbor, Mich.